American Machinist

ESTABLISHED 1877

McGRAW-HILL PUBLISHING COMPANY, INC.

New York, June 2, 1932

VOL. 76 NO. 22

The Banker's Move

His position secured by Federal Reserve action, his responsibility for aiding industrial recovery is clear

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ATTEMPTS to turn the tide of business depression form a most impressive list. Industry maintained wage rates conscientiously longer than good business judgment warranted, in a heroic effort to maintain mass purchasing power. When short time became necessary, work was parceled out on a stagger system to keep as many men on the payroll as possible. Congress multiplied the usual appropriation for public works several times. The railroads were given a small increase in rates and their employees agreed to a moderate reduction in pay. The automobile industry gambled on the 1932 Show with cars that carried refinements undreamed of a short time ago. Ford announced his new models before he was entirely ready because the delays unavoidable in so radical a change in model were believed to be holding up Spring buying of all types of cars. General Motors staged its big series of local exhibits.

And deflation continued. Every business indicator persisted in declining.

Finally business and industry resorted to salary reductions, one after another, then to wage cuts, then to more or less protracted shutdowns. As a nation we began to be hysterical and to seek a scapegoat. We blamed the President, and the Republican administration, and the Democratic Congress. We bemoaned the speculative frenzy of 1929, and we cursed the bears of 1931. The international banker came in for his share of condemnation.

We have blamed capital, and we have blamed labor. We have attributed some of our troubles to the anti-trust laws, and some more of them to installment selling. Too much machinery is at the root of the trouble, according to some people; too little modern machinery, according to others. We have too many tariffs, or too few, depending on your point of view. And so it goes.

But, even in our wildest gyrations, we generally come back to one point—the attitude of the banker. He is accused of holding back on every effort of any group to dig itself, and the country, out of the morass. He is accused of various other faults, but they will be considered later in this article. Let us see what has been done to straighten out a very intricate banking and credit tangle, and why it is now the banker's move.

In the current issue of *The Business Week,* Virgil Jordan paints the picture clearly, basing the timeliness of his observations on the formation of the Young committee by the Federal Reserve Bank of New York.

He says: "Organization of an unofficial committee of big business and bank men under auspices of the Federal Reserve Bank of New York and chairmanship of Owen D. Young, and explicit statement of Administration opposition to a large public works program were outstanding developments in further recovery efforts during the week.

"These were consistent parts and logical extensions of the Administration's depression policy as developed during the past three years. Step by step since the original White House conference of business leaders in November, 1929, to pledge maintenance of private construction programs, the purpose has been to promote business and financial confidence, strengthen the banking position, prevent suspensions, stop hoarding, check deflation and finally stimulate credit expansion through regular banking channels. The war-debt moratorium last June, the National Credit Corporation, the Reconstruction Finance Corporation, the Glass-Steagall Act and the aggressive Federal Reserve policy of open market operations begun in March were successive stages in this strategy.

"Some of its objectives were fairly successful until recently; bank suspensions and hoarding were reduced during the first quarter of this year, but there has been some increase of currency in circulation since, and a somewhat less satisfactory record of bank failures during April. Other results, by way of active credit expansion by member banks and improvement of business activity, security markets and commodity prices, have been unduly slow. The mechanical problem of accelerating recovery has reduced itself to one of transforming bank credit resources—now accumulated in excess bank reserves in main money centers as a result of Federal Reserve open market policy—into active use in payrolls and commodity purchasing.

Demand for Loans is Limited

"Evidence is abundant that only 'needy borrowers' want to borrow, and few important business concerns are eager to float new security issues, except for refunding maturing debts. In some places, of course, bank resources are not large as yet and new applications for credit have to be rationed with care, but the banking position has so far improved that there is considerable pressure upon the stronger banks, especially in the larger centers, to employ their surplus funds. This is evidenced by the record low yields on short-term government securities and other very liquid paper. The banks are not making many new commercial loans because there is little or no demand, and they are not buying long-term corporation bonds because of lack of confidence in the outlook for the bond market, due to legislative and fiscal uncertainties.

"The Young committee and similar bodies likely to be set up in other Reserve districts are intended to help break this credit deadlock. Just how is not yet clear. Generally the committees will provide agencies for co-operative effort among banks and leading business interests: (a) to support the bond market by concerted action heretofore lacking in sporadic bond pools set up on bad breaks, but in turn broken by liquidation by non-co-operators when improvement in prices appeared; (b) to promote new business projects promising increased employment but unable to finance it under prevailing security market conditions; (c) to assist refunding operations not now covered by Reconstruction Finance Corporation functions.

"The whole idea is an effort to promote recovery by normal capitalistic processes of reviving private capital investment through regular banking channels. One difficulty is that it depends upon voluntary co-operation among banks, which was not conspicuously successful under the National Credit Corporation; another is that the banks and all needy business are already suffering from over-extension of long-term credit or excessive capital investment."

In view of the drastic steps that have been taken to help the banking situation it would be reasonable to expect the banker to show some sort of confidence in conditions, and to take an active part in stimulating industrial activity. Yet the feeling persists that he is crowding in on those who owe him money now that his own worries have been removed by government support of the credit structure. Is this feeling justified?

To check up my own impression that it is not justified and that the banker has suffered through being selected as a scapegoat when all other sacrificial individuals had exonerated themselves, I asked 25 prominent machinery builders and dealers in a dozen industrial centers this question: What attitude are the banks in your community taking toward legitimate commercial loans to machinery manufacturers?

The answers were unanimous, with one exception, to the effect that bankers are doing all that can be expected of them in extending credit to industrial customers that are entitled to credit. Here is what some of them say:

"For many years we were not in need of assistance from a bank—until about a year and a half ago we borrowed a liberal sum of money which was, however, no where near the credit we should be entitled to. This money was loaned us at a very reasonable rate of interest and the loan was forthcoming without any difficulty whatsoever. Fortunately, we were able to pay off this loan entirely in a comparatively short time. Since then we have been asked whether we were not in need of money, which would indicate that the bank would gladly loan it to us. Under the circumstances we feel satisfied that the banks in this city are very reasonable and are going a long way in making loans to legitimate borrowers.

"Just the other day we were approached as to whether we might be interested in a machineray business to which two banks had loaned a considerable amount of money. The loan is of several years standing and the customer has been asked to reduce but has been unable to do so to an extent that was satisfactory to the banks. The security put up for this loan has depreciated considerably and the manufacturer has nothing more to put up. If the bankers wanted to be hard they could, of course, close in but they are not doing so in the hope that some means will be found other than foreclosing or appointing a receiver. In this connection I might say that a remark made by the gentleman discussing this matter with us was interesting. He said that the manufacturer is not worried but instead is letting the banker do the worrying for him and letting him whistle for his money."

A manufacturer 1,200 miles away from the one whose letter has just been quoted has this to say:

"So far as this particular section is concerned I have no criticism of the attitude of the banks toward the manufacturers except that in some cases they have been too liberal."

Credit to the Wrong Company

One of the bad effects of unintelligent extension of bank credit shows up in the following quotation:

"It is my impression that the banks could do a whole lot toward relieving present conditions, if they went at it in a sane and intelligent manner. It has been my experience that banks have occasionally made loans to firms that were not on a profit-making basis, and have refused loans to a concern having higher ideals as regards profits. To my mind, the latter should receive the consideration from the bank, rather than the former, as it would seemingly be a better risk. Some plants that are being kept going by the banks are cutting prices at a terrific rate, and it is impossible to conceive that they are producing at a profit. The chances are that they are not aware of their costs, and they are therefore taking what little business there is away from a firm that knows its costs, and can put a price on its goods which will at least allow an even break."

How strong are applicants for loans likely to be? This builder has his doubts. He says:

"It would appear that banks in general have had such a bad case of nerves over a period of the past year or more, that when they get relief from the Reconstruction Finance Corporation and the Glass-Steagall Bill, and when additional credit is available to them through the recent purchases of government securities on the part of the Federal Reserve Board, their first reaction is to let this money pile up.

"Surely the banks will very shortly make these funds available for those manufacturers who might reasonably expect to receive bank credit. We are just a little bit afraid, however, that due to the fact that no manufacturer wants to expand right now, and that most well managed manufacturers are in a pretty strong cash position, the average applicant for bank credit will not be the best kind of risk."

The man who wrote the following was once a banker himself:

"The banks in our district have followed a very conservative course. Our banking system being what it is I hardly see how they could have done otherwise. There may have been cases where some bankers have made improper efforts to make their institutions preferred creditors, but I have not heard of any specific instances. The bankers along with all the rest of us have been having a hard time, and as their condition improves all will share in it, some radical political opinions to the contrary notwithstanding."

Frozen loans are serious in the community from which the next correspondent writes. He says in part:

"I do not think that the banks of this city can be justly criticized for their policy on industrial loans. They have a large amount of money loaned to various industries which is absolutely frozen and will remain frozen until business picks up. I do not think they have been unduly severe in their attitude toward any of these loans. Perhaps they may be making a virtue of necessity, however, because they do not want to own the plants, and candidly that would be their only other alternative. The loans can't be repaid and the banks know it."

No Legitimate Requests Denied

The banks in this community have certainly built up an enviable reputation. Their client writes:

"So far as I know, the banks in our community are perfectly willing, and have already shown themselves able, to provide such financing as machinery manufacturers require. I know of no case where any legitimate request has been denied, nor do I know of any instance where they have taken an unreasonable attitude when they have provided loans. On the contrary, there seems to be a desire to be helpful, an attitude of a sort—and displayed to a degree—that has been very encouraging.

"I must confess in that respect I think our local banks are better performers than banks in most other communities, not only in times like these, but on the average."

This manufacturer quotes a specific case to prove that the banks in his community are much above the average. He says:

"Generally speaking, the banks in this city are possibly in a far better condition than the average over the country. While here, too, the banks are endeavoring to improve their so-called liquid condition, I know of only one instance of a machine tool manufacturer not being able to meet this demand. In this instance, when the attention of the president of the bank was called to the situation, he called off the branch bank which was handling the case."

And this manufacturer has gone so far as to run down and prove false rumors that banks are squeezing their customers. Here is a quotation from his letter:

"I have heard a number say that the banks, relieved from fear of the need of failure by the Reconstruction Finance Corporation, have been emboldened to demand liquidation of customers' loans. But in every case when I have attempted to run these rumors down I find that they fizzle out.

"A man came to me not so long ago accusing our local bank, and when I asked for specific details to enable me to judge the case completely, the accuser shrank from giving them. Frankly, I believe our local banks are ready to loan money to anyone who is entitled to it. The trouble is that many are not entitled to a bank's confidence and are simply trying to borrow money to keep the already dead body from being buried."

These comments, from men in a position to know whereof they speak, give the banker a pretty clean bill of health so far. He still has a tremendous responsibility, however, in the moves that are yet to be made before we are out of the woods. His next move will be awaited with anxiety. And it will do no harm if his clients continue to remind him that they are looking to him for co-operation and broad minded leadership on a scale that is new to the average banker.

NEXT WEEK

In many kinds of manufacture, welding is regarded as an auxiliary operation. But in making Electrolux refrigerators, this process takes 40 per cent of the operating personnel. Welding has been conveyorized; pressure-tight connections are made with the work in motion. And for many operations, women have proven more efficient than men.

The transient air traveler needs service for his plane, but as yet facilities are inadequate. However, California boasts of the world's largest independent aviation service, described in the next number.

William C. Betz tells of a variety of three-point gages for external and internal use and their specific applications.

Discussing a reference book sheet, Paul R. Fechheimer gives some additional information on "Approach Cuts for Milling and Hobbing." In a picture page, several views of the government railway shops at Queensland, Australia, are shown.

IN A. M.

As many as a million parts may be included in one model. Here a Boucher craftsman is at work on parts for tiny DeSoto automobiles

Plant Layout in Miniature

Models have long been the foundation of good ship design. Now they are being used in planning shop and production layouts

FEW executives can visualize drawing details in three dimensions. The Pharaohs of Egypt recognized this fact and had scale models built of their houses, their boats, their manufactories. Hundreds of years later, the Kings of England had models built of projected warships, models that showed in full detail the location of keelsons, sternposts, bulkheads, other timbering, and all elements of the design. From these Admiralty models, they approved deck arrangements, sailing rigs, hull designs. Their selection was transferred to paper directly from the model, for it was built in "lifts" which could be taken apart and laid upon paper for tracing.

With the better understanding of drafting principles and advances in drafting practice, engineers began to believe that models were not necessary—with the result that many an expensive ship disappointed her designers and her owners. So models came back and are used today.

So short a time as fifty years ago production was only a word, mass production a dream. The steadily increasing complexity of our manufacturing set-ups, coupled with the growing need for flexibility, is causing the introduction of models for planning arrangements of plants, assembly and production lines, even piping and machine locations. The reason is still that elusive third dimension, for no matter how carefully a complex plan is detailed, construction will show pipe lines, conveyors, stacks or something else on the exact spot where a machine is to be placed. This necessitates expensive changes, changes which could be made much more cheaply if they occurred in a model. The Detroit Edison Company has discovered this for itself and now uses models to design every piping layout. Certain automobile manufacturers use them also, but largely to aid in determining proposed exterior appearance of their projected cars.

Models are not limited in use to these matters of layout and appearance nor as mantel decorations. Stresses to be encountered on the new Kill van Kull bridge were first determined by experiment on a scale model. Government marine engineers lay out hull plates and determine stresses on models. Aeronautical engineers determine stresses and speed characteristics of hulls and wings in the same way. Models are also used for advertising purposes, for instruction, for demonstration, for publicity or photographic purposes. Several companies have recently exhibited models of their equipment at the power shows, auto shows, or other exhibitions. Erie Forge Company, drop-hammer manufacturer, has mounted a scale-model hammer on a truck body so that it may be driven into a prospect's plant for demonstration. No salesman, no matter how fluent, can describe so well or so accurately the action of a machine or mechanism.

Walter Dorwin Teague, after he had designed the new Marmon Sixteen, had a model built on a scale of 1 in. to the foot. It was photographed in a variety of positions in order that these photographs might be projected on the screen to show Marmon engineers what the proposed car would look like when built. Their criticisms resulted in certain alterations, then the process

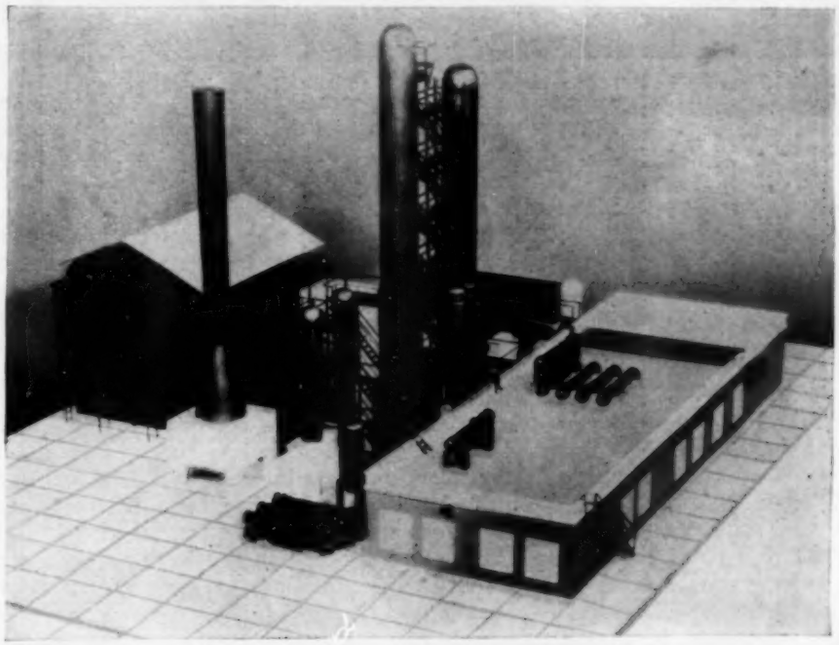
was completed. When the model was accepted, it was taken to the Marmon factory and there used in laying out parts and plans for the car itself. Similar procedure precedes design of every American warship.

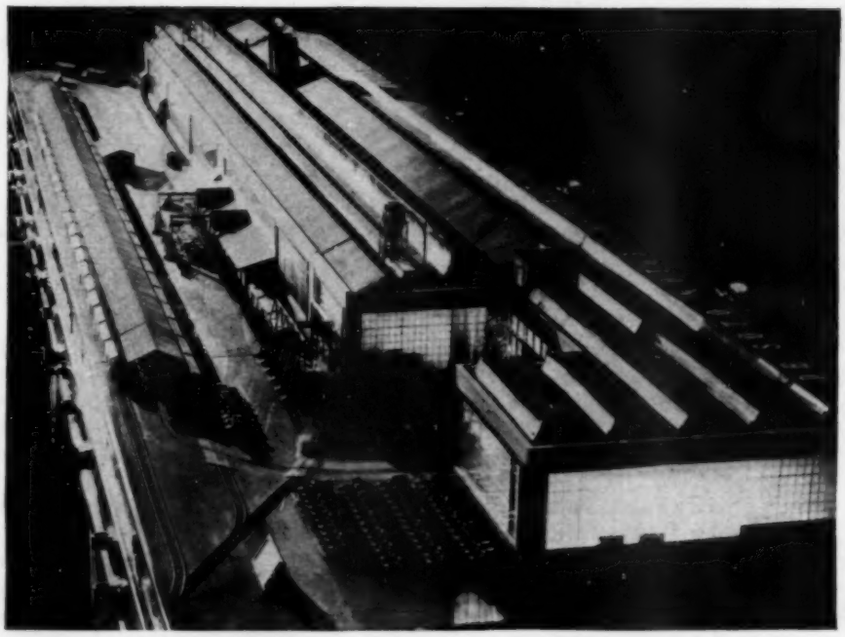
The models of the DeSoto automobile plant and the General Motors proving ground are typical of what can be done. The former was described in *American Machinist* early this year when it was shown at the New York Automobile Show. It shows in detail the workings of the entire assembly line.

Similar set-ups, but not so ornate, aid the engineer in visualizing a plant layout. One American engineering company, for example, recently bid a foreign government order for a petroleum cracking plant. Company engineers worked and rearranged for weeks, but still when the time came to submit the proposal to the government, they had evolved no arrangement that was satisfactory. In desperation, company executives appealed to H. E. Boucher, one-time model builder for the Navy and for the last 27 years head of the H. E. Boucher Manufacturing Company, probably the country's largest builder of scale models. Mr. Boucher was given the plans on Monday noon; on Wednesday night the model illustrated sailed with the vice-president of the engineering company. Its base is a checkerboard on a scale of $\frac{1}{4}$ in. to the foot, the buildings being movable and rearrangeable as desired. Incidentally, it will be noticed that the model shows a stubby Venturi type stack. This is necessitated by the prohibition of the country against high stacks because of their excellence as artillery targets. But the legislators that drafted the law limited it to stacks—so the cracking stills, much better targets by the way, extend 35 ft. higher.

It is strange to conceive of a shipyard or plant manufactory on the eleventh floor of a building, but that is where the Boucher plant is located. Shop equipment includes lathes of both the bench and the watchmaker's precision types, drillpresses, a universal miller, punch press, squaring shears, bending rolls, a woodworking bandsaw, circular saw, jointer, and other similar tools. The working force is composed of wood- and metal-workers. Most of the former are one-time ship's carpenters, for Boucher carries on an extensive boat-model building business, and only these carpenters know the intricacies of ship design. The metal-workers are principally instrument-makers. No one but the apprentice boys has been with the company for less than ten years, several have been with it for fifteen years, one for twenty-five.

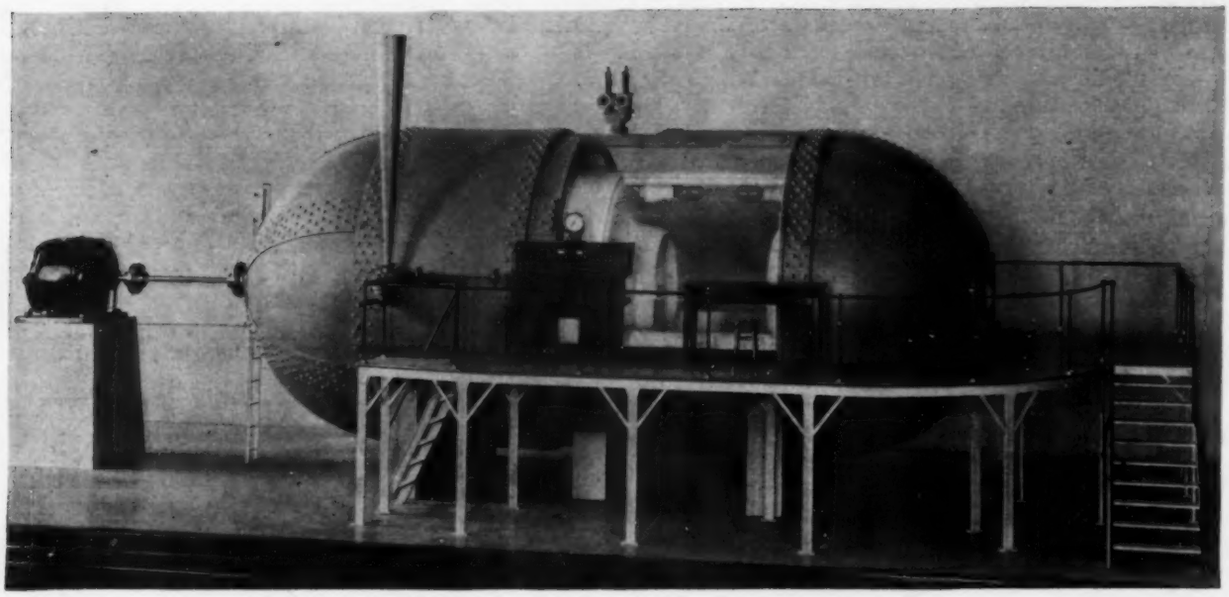
Materials worked are wood in wide variety, brass, steel, cast iron, and Britannia metal or other lead alloys. Brass strip is used for most flat parts because of the ease of working it; a similar reason acocunts for the use of Britannia metal or lead for most castings. Yet almost all parts are scaled with extreme care—for at the common scale of $\frac{1}{4}$ in. per ft., any error is magnified 48 times when enlarged to life size. If a small number of parts is to be made, they are usually turned out by hand. Larger quantities are made in





Mounted on a "checkerboard," each element of this petroleum cracking plant may be moved about until the desired arrangement is achieved. Drawings can then be made directly, for this plant is scaled at $\frac{1}{4}$ in. per ft.

From raw material to the finished car, this small scale DeSoto plant demonstrates the operation of the assembly line



Our Navy, as well as other Government departments, uses models to instruct its personnel. This is a model of a wind tunnel for the use of the Naval Academy at Annapolis

slush molds; still larger quantities are cast from patterns or made in permanent molds. Production decisions are based on cost entirely, just as in any other metal-working shop, for all model building is done on a contract basis, and the hand work on a given job usually runs much over the estimates. In making the General Motors proving ground model, for example, the finished job cost $7,000 more than the contract stipulated, largely because Mr. Boucher put in certain extras and additions in order to better the job. When General Motors officials saw the model, however, they readily agreed to the additional cost.

Even a model-maker has his design and production problems, magnified because the job itself is so much smaller than full-size production. Not so long ago, one model required a motor smaller than an inch over-all. No motor manufacturer could be found to supply it, except on special order. But Mr. Boucher happened to remember that his barber had pridefully demonstrated a new hair clipper several days previously, one in which the driving motor fitted within the handle. A hurried taxi trip, and that motor manufacturer's name was obtained.

Another model, 11 ft. long, was too large to take downstairs, either by elevator or sling from a window. The difficulty was overcome by removing the side walls of two 8x8-ft. freight elevators, edging the model in, and taking them down together. Had one elevator stuck or speeded up, a $15,000 model would have been just kindling and scrap iron.

Model building, in common with other businesses, has its boom and depression periods. Mr. Boucher discovered that fact some years ago and as a result installed a toy manufacturing business to fill in the quiet spots. But today the toy building business has grown so large that it has been separated from the model plant. However, it is still a model-building business on a production basis, for the products are miniature steam engines, locomotives, boats, cruisers, yachts and parts for them, each part accurately to scale. The finished toy is a true miniature, for "It is just as easy to make it right."

Johnson Saves Money by Canceling Charges

JOHN R. GODFREY

"AUDITORS and accountants are funny birds, Godfrey," said Old Man Johnson the other day. "They eat figures for breakfast, but they don't always digest 'em. They plumb forget that figures are only tools to use to find out something you want to know and that they mean darn little all by their lonesome.

"We had a dose of accountants last year, and they pretty nearly drove us crazy. They put in more gadgets to keep track of petty items than the items were worth. Kept preaching about the little leaks that were sapping the business, then increased our costs trying to keep track of every postage stamp and eraser. They never seem to realize that it's sometimes cheaper to give a thing away. than to get pay for it!

"Tom has a lot of horse sense, Godfrey, that even his education didn't spoil. He checked up on these auditor birds and found it cost us a dollar in office expense to check up on all minor repair items. Seems too much, I know, but that's what it cost.

"So Tom had the bright idea that we quit billing charges for repairs unless they came to at least a dollar. When a man sends in a little repair job that comes to seventy-five or eighty cents there's no charge made. We save twenty or twenty-five cents and he thinks we're the real people and tells his friends what liberal guys we are. It builds good will and saves us money at the same time.

"But the accountants threw a fit and told him it wasn't done. They figure you have to put down every last item even if it loses money for you. Tom don't see it that way. It's net dollars we are interested in, not figures."

Two-Direction Turret Tool

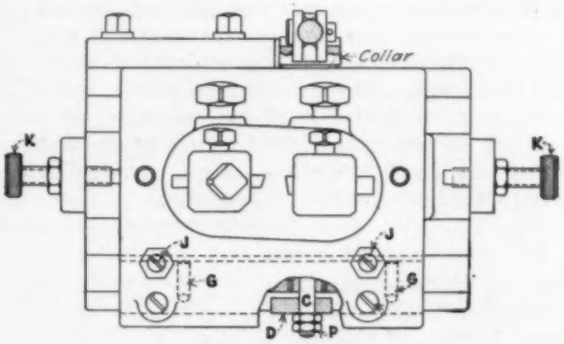
JACOB DECKER
U. S. Rubber Company

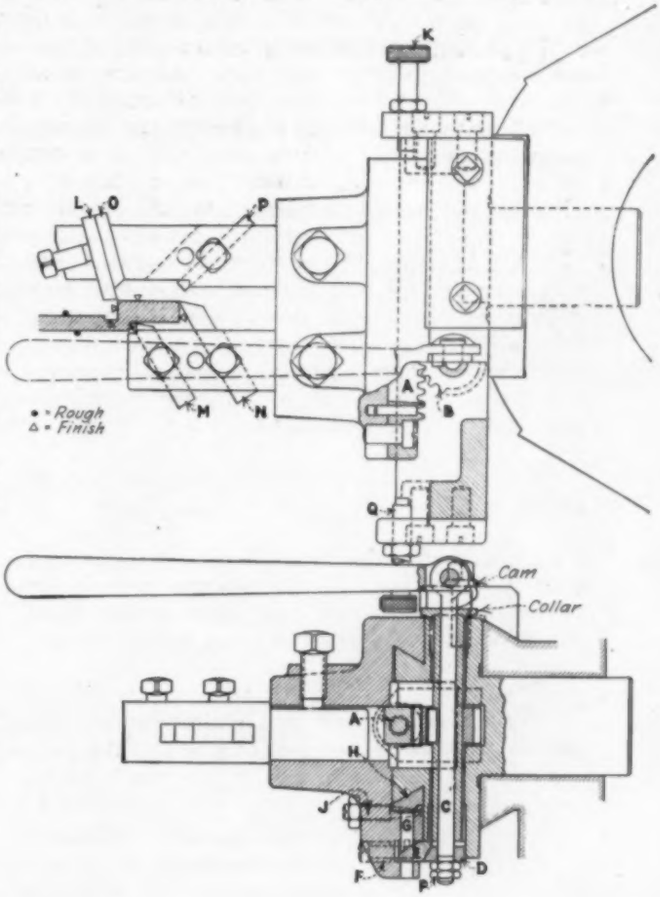
ON a recent turret lathe set-up in which a bronze casting was to be machined, two turret stations and a number of apparently unecessary motions were required. It appeared possible to design a tool that would provide suitable cross-feed of the tool bits and that at the same time would securely lock the slide when the longitudinal feed was used, thus requiring only one turret station and a single operating motion. In other words, the tool had to be rigid against longitudinal motion, but movable for crossfeed. Stock to be removed was not more than $\frac{1}{16}$ in., and the groove which may be seen on the casting was cast in.

The tool illustrated was designed for the job. A rack *A* is mounted inside the slide which holds the boring and turning bars. A pinion *B*, keyed to a hollow shaft, transmits movement of the operating lever to the rack. The hollow shaft has a collar at one end milled out to receive the flat end of the operating lever which is provided with a clamping cam at that point. Through the hollow shaft, a spindle *C*, pinned to the operating lever, acts on a wedge *D* when the lever is moved upward. This spindle movement is of course caused by the cam at the end of the operating lever. Along the lower side of the slide, a strip of steel *E* is held in a groove by two screws and springs *F*. This strip acts as a double wedge to transmit the clamping action from the single wedge on the spindle to the pins *G*. These in turn lock the gib *H* and thus tighten the slide upon its support. Screws *J* with tapered ends serve as a means for gib adjustment. The clamping movement can be altered by adjusting nuts on the spindle. Stop screws *K* at the ends of the support allow stop adjustment for the slide and prevent over-run in cross-feeding.

Cutting action of the tools is fairly simple. The turret is fed longitudinally with the turret crossfeed held against the back stop by the clamping lever. Tools *L* and *M* make the longitudinal cuts. When the longitudinal cut is completed, the turret handle is dropped to unclamp the slide, and at the same time brought toward the operator to operate the crossfeed. Tool *L* then faces the groove while tools *M* and *N* face the shoulders. As the facing cuts are completed, tools *O* and *P* chamfer the inside edges. When the chamfering is finished, the turret is backed against the far stop, clamped, and returned to the loading position.

No binding occurs when the operating lever is turned, since the clamping cam has released the wedge. The single wedge slides loosely along between the double wedge and the support. Although clamping pressure is not always equally distributed between the gib-locking pins, the arrangement is entirely satisfactory.





The FOREMAN'S ROUND TABLE

By What Right?

"What do you know about ethics, Al?"

"Very little, Ed, I'm afraid. Why do you ask?"

"Oh, I'm full of ethics this morning. I went to a forum at the high school last night and heard a lecture on business ethics. So I know all about it."

"Who was so good, you, or the lecturer?"

"Both. He was a good talker, and I was a good listener. Honestly, Al, I didn't believe such a subject could be made so interesting. I'm going again."

"What particular phase of ethics did the lecturer discuss, Ed?"

"It had to do with the depression, of course, and what caused it."

"What did he say that made it so interesting?"

"Oh! He covered quite a field, but the part that interested me was whether management was justified in installing pensions, welfare activities, and other things that increase the cost of an article, or whether it should pass on all savings or a part of them anyway, to the consumer, who is supposed to be catered to."

"Yeah, and what conclusions did the lecturer arrive at?"

"He said that the ratio of price to cost was entirely out of line. He blamed management for paying stock dividends and bonuses that were not justified and passing the cost on to the customer."

"Well, I don't know as I entirely agree with him about luxuries, but I will agree that the ratio of cost to selling price is somewhat out of line. If a man buys a $1,000 automobile, he has to pay for a lot of advertising, publicity and sales promotion that I don't think is warranted, but how are you going to get around it."

"Search me, but there ought to be some way. We don't have a heavy sales overhead, do we?"

"No, Ed, probably not as much as we should. By that I mean maybe we could do more business if we had more salesmen out. The small shop can always dictate prices to the large shop. But, on the other hand, the big shop gets more business, and can always beat the small shop price on any particular job, because it can afford to take it at a loss. The small shop can't afford to take a single job at a loss. It's a mixed-up business."

"Yeah, I'll say it is. But tell me, Al, wouldn't most businesses get along just as well if they did away with sales expense entirely? That lecturer said something about every child born being a potential automobile buyer. Just what did he mean?"

"I don't know just how he used it, Ed, but probably what he had in mind was that you don't have to sell an automobile. Everyone wants an automobile, and all the sales expense in selling one is spent to induce a person to buy a particular make of automobile. Some people claim that each make of automobile would sell as many cars if the present high-pressure methods were not used, and that, therefore, they are not justified. Possibly that is what your lecturer had in mind."

"I don't know. I only know that he was very emphatic about wasteful sales expense. He said the thing that proves it was wasteful and unnecessary is the fact that sales forces can't sell now. When everybody wanted something, of course they could sell. Anyone can take orders, but if people don't want to buy no one can make them. If about 40 per cent of the selling price of an automobile, for instance, was cut off, you wouldn't have to worry much about selling them."

Has industry indulged in unnecessary refinement of management? Is management subject to wasteful extravagances, the same as an individual, in times of plenty?

Discussions

Other Times, Other Men

Because of specialization it is becoming more and more usual for firms to train their own men. Experience has proved that it is easier to train men who are ignorant of a process than men who understand an allied process. The difficulty with the latter men is that when trained for a new process they try to apply their original training to it. When a man has been trained to any method, it is not easy for him to adapt himself to another. There are exceptions, of course, and to refuse to train an old employee because he is used to the firm's old methods is not advisable.

It is really a matter of selecting men for training; there should be no difficulty in selecting suitable neophytes from a firm's old employees. The fact that partly skilled men do not benefit so much by training as unskilled labor is probably due more to unsuitable training than to the men. If only new men were taken for training it would put a stop to permanency of employment, men would know that employment would only last as long as the methods then used lasted. This would be bad for the whole industry. When needing men for special training, new men should not be engaged if old employees are available for training. There may be a little more trouble during training, but it would pay in the long run.

—W. E. Warner, *Herts, England.*

Poetry of Motion

There is much more to be said for rhythmic motion than economic motion where repetitive work is concerned. The fact that rhythm is introduced minimizes the conscious effort necessary in economy of motion. The speed of typing machines, etc., has been, in the past, accelerated by economy of motion, but when the dead line is reached, rhythm has to be introduced as an inducement to greater output.

The human element is well worth considering. No two people have the same sense of rhythm, and to endeavor to apply economy of motion to two dissimilar individuals would, in all probability, produce disastrous results in one, if not both, cases. Rhythm, on the other hand, springs from the individual, and is therefore tuned to suit the specific temperament.

—E. Wardle, *Durham, England.*

How Much Economics?

From the flood of statements that the foreman finds confronting him every month it would appear that the management has gone statistics mad. When one attempts to fathom some of these mysterious sounding items in the statements, it seems evident that the office has developed an accounting complex.

However complex the system, a thorough knowledge of a production cost set up, and all that enters therein is vital to the departmental foreman if he is to effect cost reductions and forecast intelligently his own expense budgets. Those indirect costs which seem to be particularly elusive and which mount up into large figures, particularly get under the foreman's skin unless he fully appreciates their significance.

In many concerns, the foremen are enlightened through the medium of foremen's training classes. A night or two devoted to "costs" usually is sufficient to give the foreman a grounding in economics.

—H. S. Deeley, *Planning Engineer, Johns-Manville Company, Asbestos, Que., Canada.*

Treasure Chests

To become effective, suggestions received must be reviewed by an impartial and intelligent committee. Large corporations pick some of their best men to serve on these so-called review committees, nearly all of which have a representative of the employees as well as the employer.

Give the suggestor an idea that he is making an enemy of his shopmate or fellow foreman or that he will be made to suffer by his immediate superior, and you will be looking at an empty suggestion box the year round.

Unfortunately, some suggestions create bad feelings between employees, and the suggestor is led to believe that he will be ostracized if he makes a similar suggestion again. This is the chief reason why more worth while suggestions are not received.

Another reason why few suggestions are submitted is the fear of the reaction on his superior if the idea reflects on the ability of the man in charge of the job. Any suggestor who thinks that his suggestion may create jealousy should put in the idea and then inform his leader of this action. If he is of the right stuff, the foreman will appreciate this and cooperate to see that his man is rewarded.

—J. E. Donovan.

Old Man Opportunity

Given the opportunity, with the necessary ability, there is no reason why a clerk cannot become a bank manager. Similarly there is no reason why a miller cannot become a turner, but the last thing I should suggest towards that end would be to permit him to come in to play with a lathe while his companions were out doing their week and week. In my opinion such an arrangement cannot work very well. In the first place, putting a learner on an old lathe is bad practice. He cannot do good work on an old machine, and from his results on such a lathe, he can form no idea as to results possible with a good lathe. But no wise foreman would place a costly lathe at the mercy of a learner.

—J. T. Towlson, *London, England.*

Tools a la Carte

Much as management would like to abolish it, the toolroom is the one indispensable department of the factory. No plant using machinery can possibly do without one. And a toolroom requires an adequate supply of machines and equipment for its own peculiar needs and uses.

Most tool work can not wait until tomorrow or next week for some machine or operator to become available as would be the case if the production shop did the machine work. Production runs on a machine can not be stopped to get out the one or two pieces for the tool shop. The additional set-ups and the disruption of shop routine would make the production costs mount very rapidly. Of course, there are exceptions to this state of affairs. There are a few plants doing such a line of work that the machine equipment and class of labor employed is the same as that of any toolroom.

—L. O. Brown.

Blanks for Drawn Shells

Determination of blank diameters by the designer will save time and costly cut-and-try operations in the shop. The author summarizes seven different methods

C. W. HINMAN
Chief Tool Designer, Kobzy Tool Company

THIS subject—the approximate determination of blank sizes for round, square and rectangular drawn shells—while covered at length in descriptive literature, formulas, charts and diagrams, still seems to be imperfectly understood by many otherwise experienced designers. Blank sizes are too often discovered by experiment in the toolroom, when a designer with a clear understanding of the fundamental principles involved in blank development might eliminate most of these expensive cut-and-try methods.

Seven methods may be used for determining blank sizes. They are: obtaining the blank by weight, development during tool construction, mathematical formulas, diagrams, graphic methods, tables, and nomographic charts. A chart for use with the latter method was published (*AM*—Vol. 76, page 351), and the most complete tables extant, giving blank diameters for cylindrical shells, also appeared (*AM*—Vol. 75, page 943).

When computing the blank for a drawn shell, it is assumed that the work has no thickness, that is, the shell is computed along an imaginary neutral line in the material located at half the stock thickness. This fact should be remembered in all following considerations of shell dimensions. For light stock, under $\frac{1}{32}$ in. thick, the outside of the shell can be considered the neutral line, giving a blank slightly larger than necessary, which is no objection if the shell is subsequently trimmed. Otherwise, these shell blanks should also be computed from the neutral line.

In making drawn shells, there are three possible variations:

Case I. If there is no appreciable reduction in wall thickness incident to drawing, then the area of the shell equals the area of its blank.

Case II. If the wall thickness has been thinned by drawing, then the area of the shell will be greater than the area of its blank.

Case III. When the wall of the shell has been thickened by forced plastic flow, then the area of the shell will be less than the blank area.

The latter case applies in particular to shells that are reshaped in coning dies. When drawing square or rectangular shells, drawing or plastic flow occurs only around the four quadrants at the corners, the straight sides simply bend free or "form up."

Procedure is as follows in determining blank sizes by weight: Since the weight of a sheet metal blank is $W = ATC$, in which W is the weight of the blank or shell in lb., A the area of the blank in sq.in., T the thickness of the stock in in., and C the weight of 1 cu.in. of the metal in lb., we have, by transposing the formula, $A = W/TC$. If we have a sample shell for weighing, the latter formula will give the blank area. When the weight of a shell is considered in ascertaining the blank area, this formula holds good irrespective of whether the wall thickness of the shell has, or has not, been changed. If trimming the shell is necessary, the amount to be cut off should be added equally all around the blank. Having found the area A of a blank for making a round shell, the diameter $D = 1.128\sqrt{A}$. With the diameter known and the area wanted, $A = D^2/1.273$. Tables given in the *American Machinist's Handbook* for areas and diameters of circles, and squares and roots of numbers of convenient to use in this connection.

For determining the cubical content of the walls of a sample shell, balance the shell equally with flat pieces of

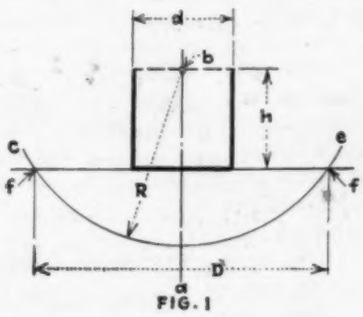


FIG. 1

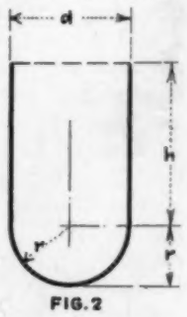


FIG. 2

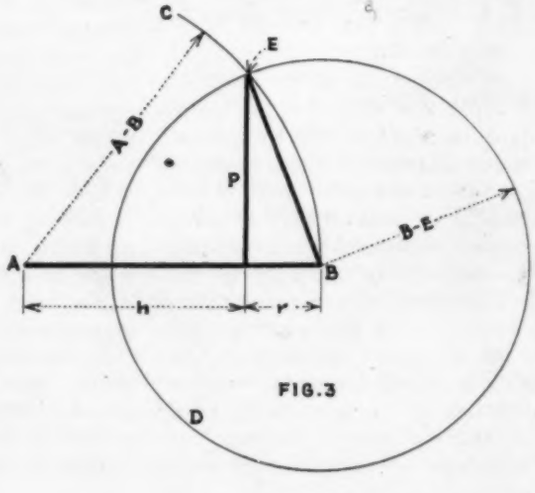


FIG. 3

FIG.4

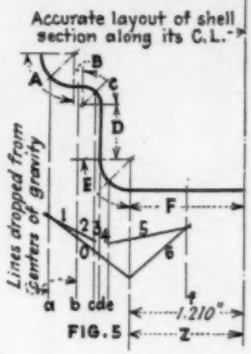


FIG. 5

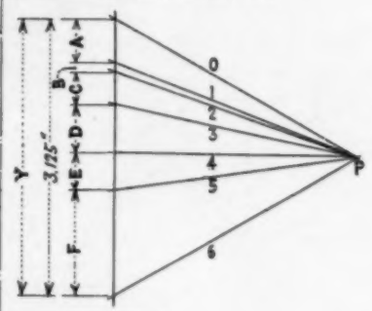


FIG. 6

the same metal at the ends of a lever, the center of which rests at right angles on a knife edge. The pieces used for balancing are then measured, weighed and the cubical content determined. A more convenient method is to use a pair of apothecaries balances. Then, given the cu.in. I, and C the weight of 1 cu.in. of the metal in lb., the weight, $W = IC$, the blank area is $A = W/TC$, and the blank diameter, or $D = 1.128\sqrt{A}$, or $D = 1.128\sqrt{I/T}$.

If the shell to be drawn is too complicated for ordinary computation, it is best to construct the drawing members of the die first, then try forming the shell with a hand-made blank that is apparently too small, and follow with other larger trial blanks, as required, until the correct diameter is attained. Usually two or three trial blanks are sufficient.

Case II considers the blanks for those shells in which the walls are reduced in blanking. It may be desired to iron the walls of a shell to a thinner gage in one or more operations. If so, the mean height of the finished shell may be obtained by using this formula: $m = ht/T$, where m is the mean height of the finished shell, h the height of the finished shell, t the thickness of the finished shell, and T the thickness of the metal before drawing. Suppose a finished shell is 2 in. in diameter by 6 in. high, having walls 0.020 in. thick, and the thickness of metal before drawing is 0.040 in. Then by this formula, $m = \frac{6 \times 0.020}{0.040} = 3$ in. By consulting the table giving blank diameters of cylindrical shells, it can be determined that a shell 2 in. in diameter by 3 in. high requires a blank 5.29 in. in diameter.

Blanking operations in Case III, those intended to thicken shell walls, are usually performed in coining dies, designed to force the metal into plastic flow and to cause it to occupy increased sectional areas. The usual methods for calculating blank diameter cannot be successfully applied. If a completed sample cannot be had for weighing, or balancing against its own material, the blank should be developed in the tool as previously described. Since the work is necessarily small (used for oil cups and similar parts) and like other diminutive work, such as blanks for coining dies, there is no real difficulty in tool development.

Many cylindrical shells must be made with square corners. Blank diameters given in the tables previously mentioned have been calculated by the formula $D = \sqrt{d^2 + 4dh}$, in which D is the blank diameter, d the shell diameter, and h the shell height. By completing the square, and transposing, values for d and h may be obtained:

$$d = \sqrt{(D^2 + 4h^2)} - 2h \quad h = \frac{D^2 - d^2}{4d}$$

Tables giving blank diameters for cylindrical shells are simply to aid the designer by quickly furnishing the theory upon which to base his calculations. All such tables are for shells having square corners, and it is practically impossible to draw a shell having sharp corners to any considerable depth because the corner will fracture. When the shell has a rounded corner, deduct the radius r of the corner from the diameter of the blank given in the table. The result will be the blank diameter for the round-cornered shell: $D = \sqrt{(d^2 + 4dh)} - r$.

For those who prefer to lay out a diagram to find a blank diameter, in lieu of a mathematical formula, many common formulas have been thus converted. Any of these formulas are susceptible to change, either to a diagram or nomographic chart, and not a few designers have accomplished this for convenient use.

Consider $D = \sqrt{d^2 + 4dh}$ as an example. Make an accurate layout of the shell on center line *a-b*, Fig. 1, full-size if the shell is large, five or ten times full-size if small. With *b* as the center, and R equal to $h + d/2$, scribe arc *ce*. Extend the bottom line of the shell, cutting arc *ce* at points *f*. Then D is the diameter of the blank If the shell has a round corner r, subtract r from D. Under the indexed subject of "Shell Blank Diameters," in *American Machinist's Handbook* is found another

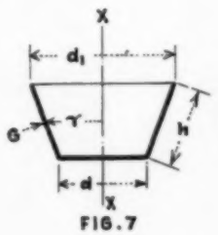


FIG.7

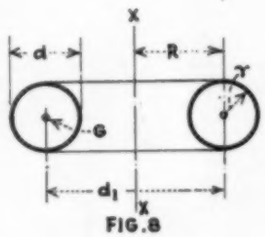


FIG.8

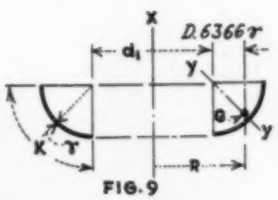


FIG.9

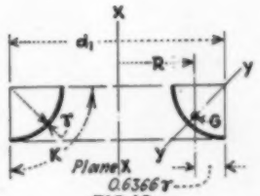


FIG.10

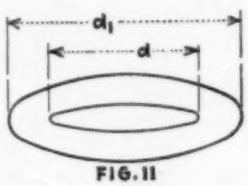


FIG.11

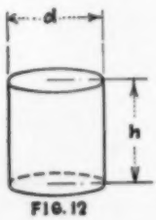


FIG.12

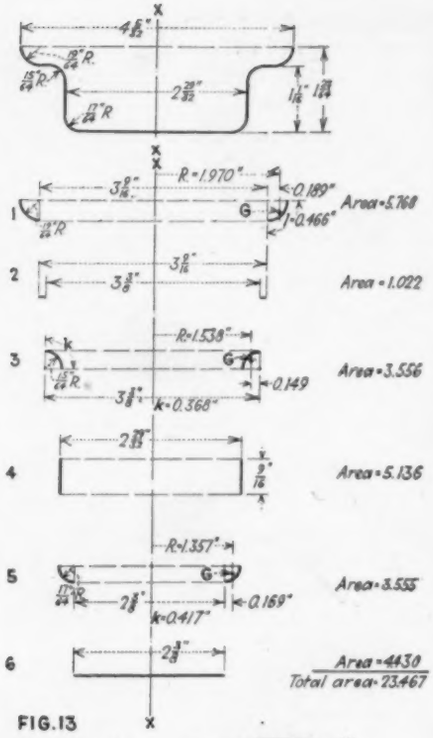


FIG. 13

Blank diam. = $D = 1.128\sqrt{23.467} = 5\frac{7}{16}$"

diagram for this formula, also diagrams for obtaining blanks for several other shapes of round shells.

Another example will suffice to show how these formulas may be transformed to diagrams. $D = 1.414\sqrt{d^2 + 2dh}$, is one formula for the blank diameter of a cylindrical shell having a hemispherical bottom as that in Fig. 2. Make a diagram of the type shown in Fig. 3. Draw the horizontal line AB, equal in length to $h + r$. Using point A as a center, and with AB for the radius, describe the indefinite arc BC. From A, locate distance h on line AB, and at this point erect the perpendicular line P, touching arc BC at E. With point B as the center, and BE for a radius, describe circle D. Circle D represents the diameter of the blank.

Tool equipment engineers have advanced to the point where they are making a practical application of the graphic method for obtaining trial blank diameters for any shapes of round shells. Notably among these graphs are those developed by the Toledo Machine & Tool Company, published in its recent engineering data sheets. Figs. 5 and 6 are examples, where the trial blank is developed for the circular shell shown in Fig. 4. Procedure is as follows: Make an acurate contour layout of the shell section, along its center line, Fig. 5. Divide it into sections A, B, C, D, E and F. Drop lines from the center of gravity of each section, a, b, c, d, e and f. Draw the vertical line X-X at one side as shown in Fig. 6, and space off the developed lengths of each section A, B, C, etc., using dividers. Draw lines to the ends of each section from any point P, and number them as shown. Draw a parallel to line 1, Fig. 6, between lines a and b in Fig. 5; also a parallel to line 2, between lines b and c (from intersection of lines 1 and b); a parallel to lines 3 between lines c and d, etc., and finally a parallel to line 6, drawn to its intersection with line O, Fig. 5, which is parallel to line O, Fig. 6. Scale distances Y, Fig. 6, and Z, Fig. 5, to the nearest half sixty-fourth, multiply them together, and then by 8 (a constant), and extract the square root. The result is the trial blank diameter. In the example given it equals $\sqrt{3.125 \times 1.210 \times 8} = 5.500$ in. diameter. When R is less than $2T$, the center of gravity may be assumed to be half way along the arc.

Areas of shells may be found easily by the Theorem of Pappus, which has a high-sounding name but is in reality simple to use. It may be applied in finding shell areas, and therefore blank diameters, for any shapes of round shells, since blank diameter $D = 1.128\sqrt{\text{area}}$. The area of any circular shell is the area of the surface generated by a contour line of the shell when revolved symmetrically around its center line as an axis. This theorem is based on the principle that the surface area generated by any line when thus revolved about an axis is equal to the length of the line, multiplied by the circumference of the circle described by a point on the line called "the center of gravity."

In Fig. 7 is an example. If line h is symmetrically revolved about its axis x-x, by horizontal radius r, touching point G, which is the center of gravity of line h, then line h will generate an imaginary surface whose area is equal to $2\pi rh$, which is the area of the side wall of the shell. By adding the area of the bottom, diameter d, the whole area of the shell is obtained. Since the center of gravity of a straight line is at its middle point, length r is the mean radius of the shell, and is found by $r = \frac{d_1 + d}{4}$

The ring shown in Fig. 8 is sometimes called a "torus," or "anchor ring." The area A of similar rings is often involved when computing shell areas, particularly at the top of a finished cup, or kettle, where it is known as a "wiring ring," produced by a curling operation in a wiring die. It may be calculated easily by using the formula $A = 4\pi^2Rt$, or $A = 39.48Rt$, and then using the Theorem of Pappus, previously described. Also $A = \pi^2dd_1$, or $A = 9.87\ dd_1$.

When calculating the areas of circular shells, it is found that nearly all of them, in cross-section, are composed of either circles or connected circular arcs, or of arcs connected by straight lines. The calculation of the required blank diameter can be facilitated by obtaining the areas of all the sections of a built-up shell first, then totaling these areas and obtaining the blank diameter D in one operation by using the formula $D = 1.128\sqrt{A}$.

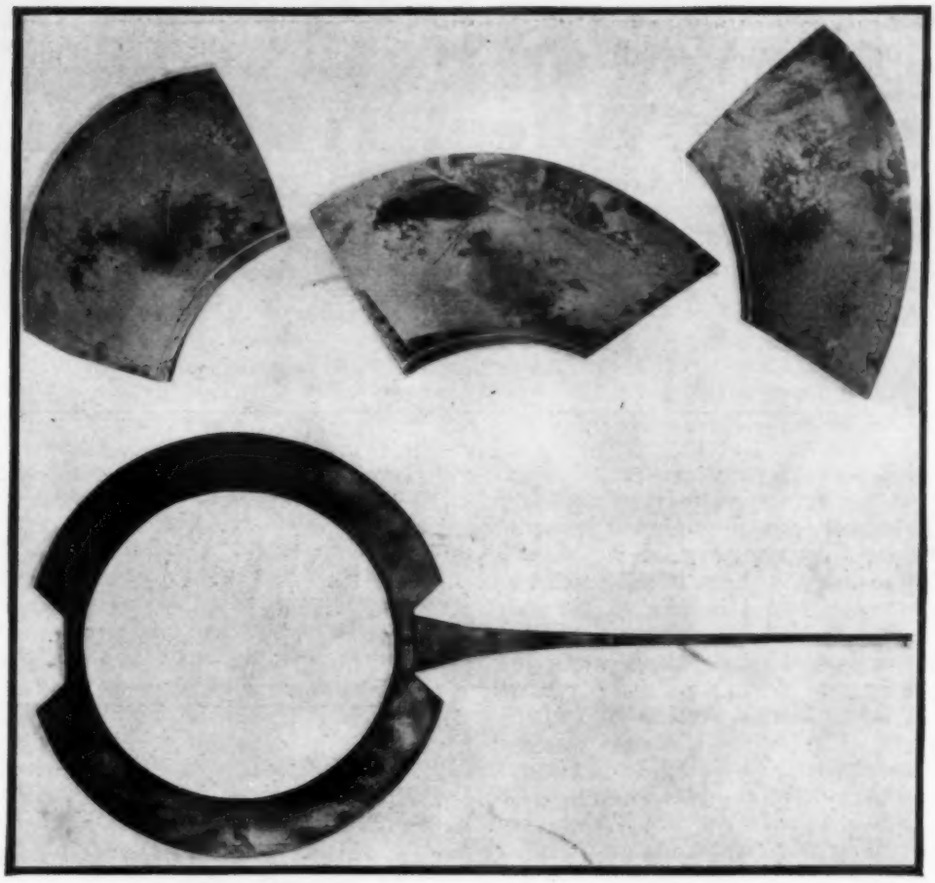
Several formulas may be based on the Theorem of Pappus. For exterior circular arc quadrants, as shown in Fig. 9, the center of gravity G is on line yy, which bisects the arc, and at a point $0.6366r$ from the center of r, horizontally. $R = \frac{d_1}{2} + 0.6366r$, and $A = 2\pi Rk = 6.283Rk$. For interior circular arc quadrants, as in Fig. 10, $R = \frac{d_1}{2} - 0.6366r$. $A = 2\pi Rk = 6.283Rk$.

For the area of a plane ring, Fig. 11, A equals the area of the exterior circle minus the area of the interior circle, or $A = 0.7854(d_1^2 - d^2)$.

For a cylinder such as that shown in Fig. 12, $A = \pi dh$.

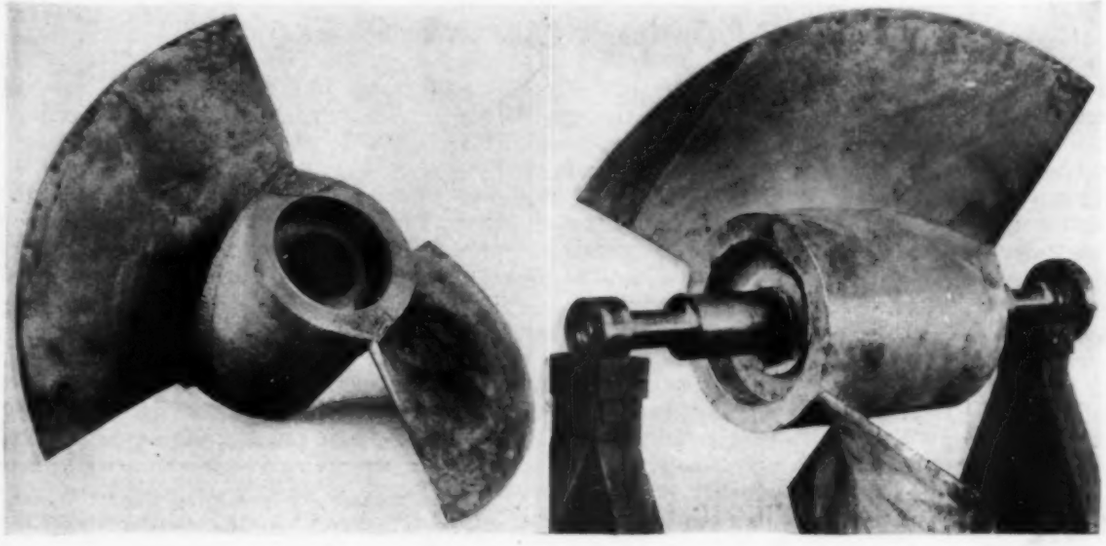
In the practical application of these formulas, the blank diameter of a shell, such as that shown in Fig. 4, may be required. In this case, first make a diametrical contour layout of a cross-section of the shell along the center line of its wall, as in Fig. 13. A neat free-hand sketch is sufficient, with the new dimensions put in. The several sections are laid out around the vertical center line x-x, as shown, the larger section at the top.

At 1 and 5, to find A, apply the formula for exterior quadrants; at 3, the formula for interior quadrants; at 2, the formula for the area of a plane ring; at 4, the formula for the area of a cylinder, and at 6, for the area of a circle. Total the areas and extract the square root, multiply by 1.128, and the answer is $5\frac{1}{16}$ in.



Built-Up Blower Fans

WESTINGHOUSE has developed a new technique of building up fans and propellers by welding sheet and bar. Here are the first pictures of the procedure. Proper taper from hub to tip is obtained in the blower propeller by machining a ring with the desired taper from center to edge. This ring is then cut up by a torch into blades, which are warped to shape in a die. The hub, cut from a length of steel tubing, is grooved to receive the butt of the warped blade. The weld is built-up of a series of beads laid side by side and one over another to bring the hub to the proper diameter. The finished hub is ground off and is then mounted in the conventional way. This construction permits the use of thinner sections capable of withstanding higher stresses than can the common cast blade. Cost is also reduced, since propellers can be built to any size desired without making or stocking patterns.



Regulating Wheel Truing Fixture

Accurate adjustment is important for the successful production of precision work in a centerless grinder

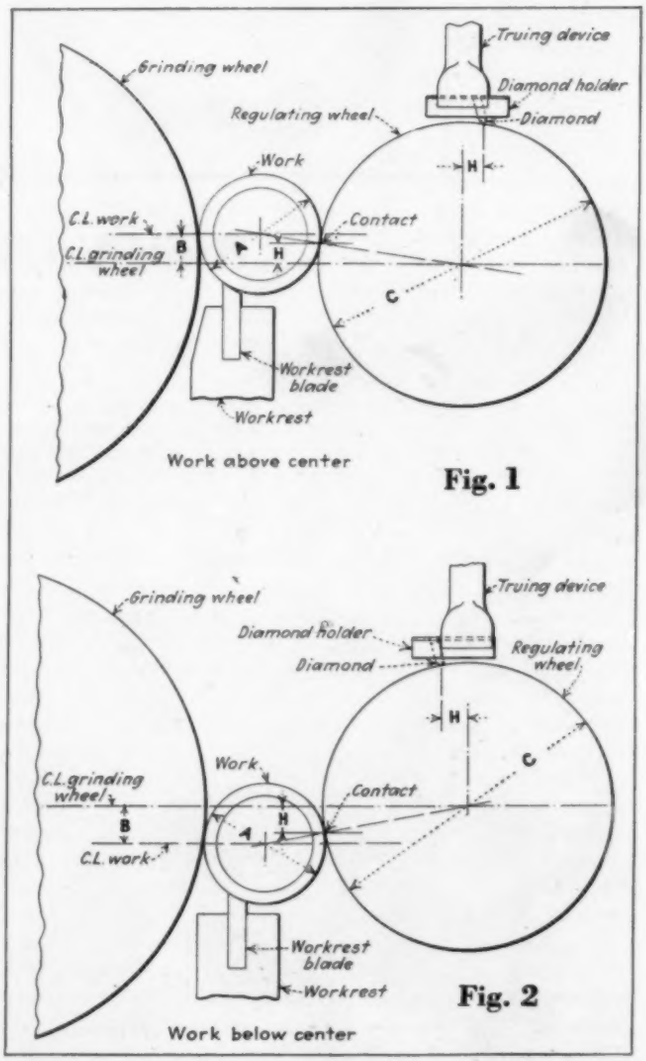
C. W. HOPKINS
The Production Engineering Company

IN USING a centerless grinder, the regulating wheel must have full contact with the work for a length as great as conditions will permit. A single or two-point contact between the work and the regulating wheel will allow the work to spring or wobble between the wheels and thereby cause the ground surface to become tapered, convex or concave, instead of straight and parallel with the axis of the work piece. When work that is relatively short as compared to its diameter, such as ball and roller bearing races, is ground by pushing a stack of the pieces through the machine, the straightness and squareness of the finished work depends to a great extent upon the accuracy of the regulating wheel profile. An accurate profile can be secured only by careful and proper adjustment of the regulating-wheel truing fixture.

The first development of the fixture is that of swiveling the device to an angle exactly equal to the angle of inclination of the regulating wheel spindle with respect the grinding wheel spindle. That is, if the regulating wheel is inclined exactly three degrees and in the direction to feed the work from the front of the machine to the rear (front end of the regulating wheel spindle pointing up), the regulating wheel truing fixture must be turned exactly three degrees, the front end pointing towards the grinding wheel. If the feeding direction is from the rear of the machine towards the front, (front end of the regulating wheel spindle pointing down), the regulating wheel truing fixture must be swiveled so that the front end points away from the grinding wheel. This adjustment is generally well understood by operators and set-up men, and with the exception of the difficulty of securing an exact agreement of the angles involved, is not the source of much trouble.

The second adjustment of the regulating wheel truing fixture is that of setting the position of the diamond to correspond to the distance above or below the center of the grinding wheel at which the work is being ground. This adjustment is necessary because the diamond must pass across the wheel in a path that exactly corresponds to the line of contact between the work and the regulating wheel in order to produce a correctly shaped wheel. The correct location of the diamond is critical and is frequently the source of considerable trouble in precision grinding. The rule in general use is to set the diamond to the right of the centerline of the truing fixture an amount equal to the distance that the center of the work is above the center of the grinding wheel spindle. If the work is ground below center, the diamond is shifted to the left of the centerline of the truing fixture. This rule, however, does not give the exact location of the diamond, and for precision grinding, a more accurate adjustment must be made.

Fig. 1 shows that when the work is placed above the center of the grinding wheel spindle, the contact of the work with the regulating wheel is slightly below the center of the work. Fig. 2 shows the relation of the line of contact when the center of the work is below the center of the grinding wheel spindle. The actual location of the line of contact, which depends upon the three variables, the diameter of the work, the diameter of the



Three variables influence the line of contact between work and regulating wheel

regulating wheel and the distance that the center of the work is above or below the centerline of the grinding wheel spindle, may be calculated from the formula:

$$H = \frac{B \times C}{C + A}$$

where:

H = Distance from contact line to grinding wheel spindle centerline. (The distance that the diamond must be shifted.)

B = Distance from centerline of work to centerline of grinding wheel spindle.

C = Diameter of regulating wheel.

A = Diameter of work.

All dimensions in inches.

It is apparent that for work set at a given location above or below the centerline of the grinding wheel, the line of contact depends upon the diameters of the work and regulating wheel. As the regulating wheel reduces in diameter because of redressing, the line of contact between the work and regulating wheel is caused to shift, and hence the truing diamond must be shifted to agree with the line of contact. Usually for work that must be held to limits of plus or minus 0.0002 in., the diamond position must be corrected for each ¼-in. change in diameter of the regulating wheel. Failure to make corrections for the shifting of the line of contact is often the reason for variable grinding results on long production runs. It will furthermore be noted that, when two diameters are ground simultaneously and the regulating wheel is inclined to give a slight feeding action to hold the work against an end stop, that inaccuracies may develop particularly if there is a great difference in the diameters. The dependence of the line of contact on the diameters of the work and regulating wheel also explains the variable results and frequent failures when grinding tapered work without the use of a special compensating truing fixture equipped with a micrometer adjustment on the diamond holder.

It is frequently desirable actually to check the shape of the regulating wheel, as it is sometimes rather difficult to determine the actual cutting point on the diamond. In some instances, the exact angle for swiveling the truing fixture cannot be found. One method for checking the regulating wheel profile is to place an accurately ground bar of the same diameter as that of the finished ground work on the work support blade and resting against the regulating wheel. The actual contact of the work and wheel can then be observed by placing a light below the regulating wheel and near the workrest. The use of feelers between the bar and the regulating wheel is not a satisfactory method for checking the line of contact.

A second method of checking the regulating wheel contact consists of an indicator mounted on a slide block shaped to fit the work support blade. In using this method, care must be taken to have the indicator stem rest on the wheel at the exact line of contact between the work and wheel. The line of contact may be scribed on the wheel by sliding a finished ground piece of work along the work support blade and resting against the wheel. The indicator should not be pushed across the face of the wheel, but instead, readings should be noted at intervals of about one inch. The variations in indicator readings should not vary more than 0.0001 in. to 0.0002 in. over the entire width of the wheel.

NEW BOOKS

AMERICAN MACHINIST HANDBOOK, FIFTH EDITION—*Edited by Fred H. Colvin. 1135 pages, 7x4 in. Published by the McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N. Y. Price $4.00.*

The fifth edition of this book appears much improved over the previous editions. Each section has been scrutinized closely, and revisions have been made in nearly every one, to bring it into accord with present practice. As for instance: Screw threads have been revised and new material included. The twist drill section has been largely rewritten and new tables and data added. The section on taps and dies has been enlarged almost 50 per cent by new material. Welding, of course, has been largely added to and brought up to date. New gear tooth forms adopted by the American Gear Manufacturers' Association are included in the new gear data and considerable information on non-metallic gearing is given.

Milling machine methods have made great advances since the previous edition of this handbook and an even 100 pages are given to this subject in the present issue. The sections on turning and boring, in order to keep pace with milling, have also been increased about 50 per cent. The same thing is true about grinding and lapping. Timestudies for machining times are included under each head. This is also true for screw machines that use bar stock.

This list of sections and the additions to each could be carried right through the handbook. The increased number of pages is evidence of this. Taken altogether, the new edition of the handbook is a compact thesaurus of mechanical facts, formulas and figures.

THE MACHINE TOOL AND SMALL TOOL INDUSTRY *(Of Germany)—By Hans Dominik. 75 pages, 6x9 in. Clothboard covers. Illustrated. Published by the Organisation Verlagsgesellschaft M.B.H., Berlin, and available from Marburg Bros., Inc., 90 West St., New York, N. Y.*

"Der Werkzeugmaschinenbau" (Machine Tool Construction) was published as the seventeenth volume of the series "Model Works of German Industry" and describes the plant of Fritz Werner Aktiengesellschaft as the typical German tool builder. It has just been made available in English.

This book is a really exceptional one, describing as it does the development of the machine tool industry, the start of the Fritz Werner organization, its development and present extent, the tools it makes and uses, its works management and cost systems, and countless other facts about it. It presents machine-tool building from a disinterested yet sympathetic point of view, with comprehensive understanding yet painstaking detail. Anyone interested in machine tools may obtain this volume from Marburg Bros. simply by mentioning *American Machinist.*

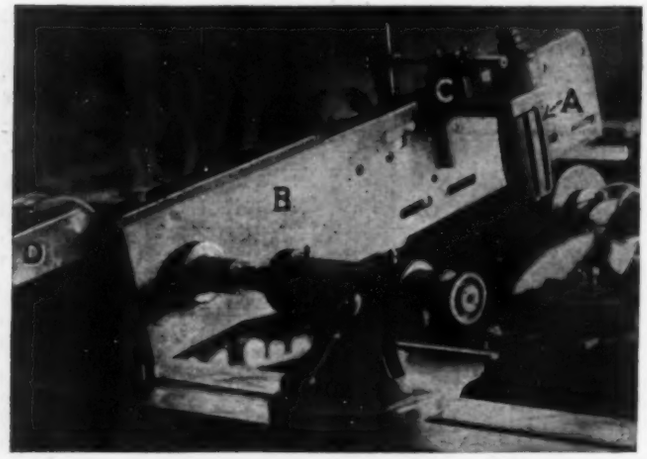
IDEAS FROM PRACTICAL MEN

Backing-Off Cutters

C. C. SHOLLENBERGER

On reading the article "Backing-Off a Concave Cutter," by Chester H. Franklin (*AM*—Vol. 75, page 712), I was prompted to describe a device we use for backing-off either convex or concave cutters by grinding.

The convex cutter shown at *A* is 5 in. long and the radius of its curvature is 21 in. After forming the cutter to a sheet-metal templet, it was fluted and then mounted



on the device illustrated for rough backing-off before heat-treating, after which it was finish-ground in the same device.

The plate *B* is a piece of 8-in. channel and is mounted on a nut mandrel held between the centers of the grinder. The shoulder at the tailstock end of the mandrel is ground to a diameter of 2 in. for accurately checking the 21-in. radius. The cutter is mounted on an eccentric mandrel, being held against a shoulder by a capscrew and a washer at the lower end. The mandrel has a bearing in the bracket *C*, which is located on the plate *B* at the correct distance from the centers of the machine. On the upper end of the mandrel is keyed a wormwheel that is turned by a hand-operated worm. Grinding is done by rocking the whole device up and down, passing the cutter lengthwise in contact with the front of the wheel. After each pass, the cutter is rotated a small amount by the worm gearing, moving it eccentrically. Counterweights (not shown) are placed on the bar *D* to balance the device and make it easy to operate.

To locate the cutter in correct relation to the eccentricity of the mandrel, a pin in the shoulder of the mandrel engages one of the flutes and bears against the face of a tooth. To index the cutter after a tooth has been backed off, the capscrew at the bottom is loosened and the cutter is dropped down until it is free from the locating pin. It is then rotated until the pin will engage the next flute. Then it is raised up against the shoulder and turned until the pin bears against the tooth face. After tightening the capscrew, the mandrel is rotated to its original position, at which time the next tooth can be backed off. This procedure is repeated until all the teeth have been backed off.

Light cuts are taken in finishing. With proper care and the use of the correct wheel, a satisfactory job will result, correcting any distortion caused by heat-treatment. For backing-off concave cutters, the wheel is brought in front of the bracket.

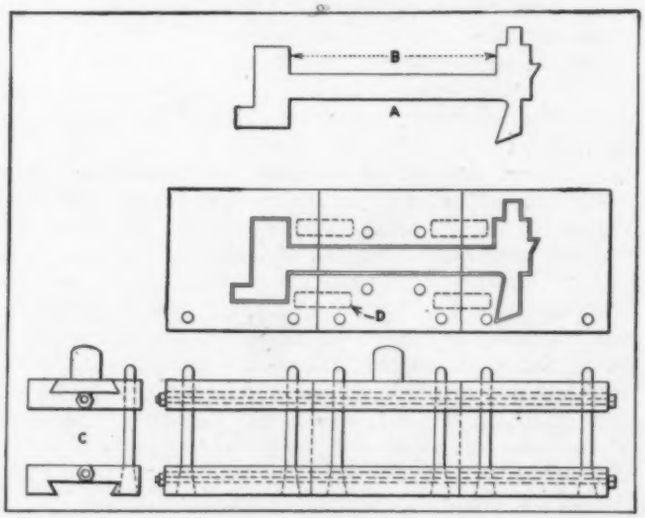
Sectional Press Tools

JESSE W. HUNSBERGER

We had an order for a large quantity of stampings, all of one kind but varying in length, the shortest being indicated at *A* in the illustration. Variations in the lengths of the center strips *B* were from 3 to 12 in., in increments of 1 in. Ordinarily, ten complete sets of tools would be required. However, we decided to make the tools in three sections, using the end pieces for all sizes and to make the sections for the center strips of the different lengths required.

Three pillar die-sets were used, the shanks fitting the ram being removed from the end sets. Both the punch- and the die-holders were dovetailed lengthwise as at *C* and were held end to end by through bolts. The punches and the dies were dovetailed to fit the holders, doweled in place and held by keys, as at *D*. The floating stripper was also in sections to suit the assembly. It was fitted to the inside of the die and backed by stiff springs that were compressed as the pieces were punched.

A similar system is used in building up dies for blanking and forming steel ends for railway cars and in the forming dies used in the manufacture of artificial limbs. The latter contain sixteen ½-in. shims to give 17 sizes. Filler plates are doweled to the die ends to maintain constant over-all length.—ED.



Press Tools for Making Tubing

CHARLES KUGLER

In a small shop making hardware specialties, I recently saw some tools for making short tubes from $\frac{3}{16}$-in. boiler plate. While I do not believe these tools are the best for this kind of work, they have some new features.

In Fig. 1 are shown the tools for bending the plate into a U-shape having the sides approaching each other at a slight angle, as indicated at *A*. The punch forces the work past the sliding pieces *B* and as the ram continues its descent, the punch recedes into the holder against the pressure of a heavy spring. Then the cams *C* force the sliding pieces inward, bending the sides at a slight angle, which is ideal for the next operation. As the ram ascends, the sliding pieces are returned to the outward position.

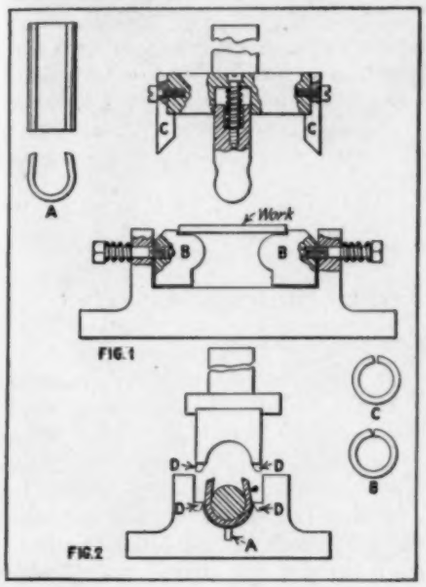


FIG. 1

FIG. 2

The tools for closing the tubes are shown in Fig. 2. The chisel-shaped piece of steel *A* is inserted in the bottom of the closing die. As the ram nears the bottom of its stroke, the metal is forced against this piece of steel, making a slight nick, which is sufficient to stretch the metal and relieve the natural spring, so that when the edges meet, as at *B*, they will not spring apart. Before the chisel-shaped piece of steel was put in the die, the tubes came out as indicated at *C*, because of the natural spring of the metal.

Had the closing tools been made as shown by the dotted lines at *D*, the cams and the sliding pieces could have been left off of the bending tools. By this construction, the beveled edges of the punch would start to bend the sides inward before the closing action.

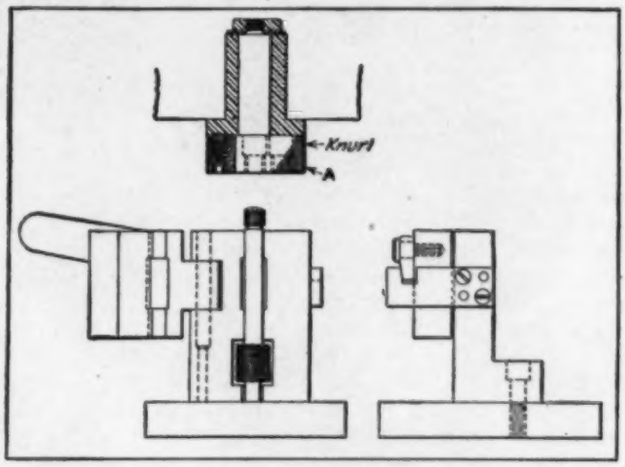
An Indexing Broach

HARRY S. TAYLOR

The accompanying sketch illustrates an indexing broach for roughing and finishing the serrations for adjusting the stems of brass valves for showers. The object of the two operations is to prevent the brass from chipping, also to insure a smooth and accurate piece of work. The stems to be broached are held in the vertical position shown and are clamped by a swinging gate, which, in turn, is locked by a lever of the wedge type.

The broach block *A* contains both the roughing and the finishing broaches, which are $\frac{7}{8}$ in. from the center and are 60 deg. apart. The shank of the broach block is a running fit in a sleeve held in the punch-holder and is prevented from revolving by a spring-actuated index pin *A* engaging one of two dimples in the sleeve. The broach is used in a punch press and the indexing is done by hand, the broach block being rotated 60 deg. in either direction alternately.

In operation, with the work in position and the roughing broach in line, the roughing is done on the downward stroke of the ram. When the ram stops at the end



of its upward stroke, the broach block is indexed by hand, bringing the finishing broach in line with the work. It is not necessary to pull the index pin out of the dimple in which it is engaged, as it is released by the slight pressure required to turn the broach block.

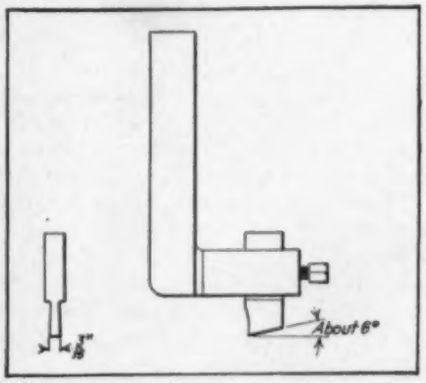
A Small-Shop Kink—*Discussion*

P. L. BUDWITZ

Referring to the article under the title given above (*AM*—Vol. 75, page 898), Charles H. Willey describes a method for narrowing the width of steel plates. I have used several simpler methods successfully.

In place of the ordinary cutting-off tool, which does not work entirely satisfactorily when used on steel plates, I have used a tool similar to the one illustrated. Bringing the cutting edge back does the trick. I have cut plates of tough steel with such a tool, using a little lard oil on the cutting edge to induce easier cutting action.

When it is not necessary to save the surplus stock cut from the plates, it is feasible to gang a number of plates on edge in the shaper or planer and plane off the surplus stock. Using a slitting saw in a milling machine without an outboard support for the arbor causes the saw to cramp in the slot, because of spring in the arbor. Binding of the saw and digging in are the results, which often cause tooth breakage. A side-milling cutter about $\frac{1}{4}$ or $\frac{5}{16}$ in. in width could be used instead, thus saving the time of the extra operation.



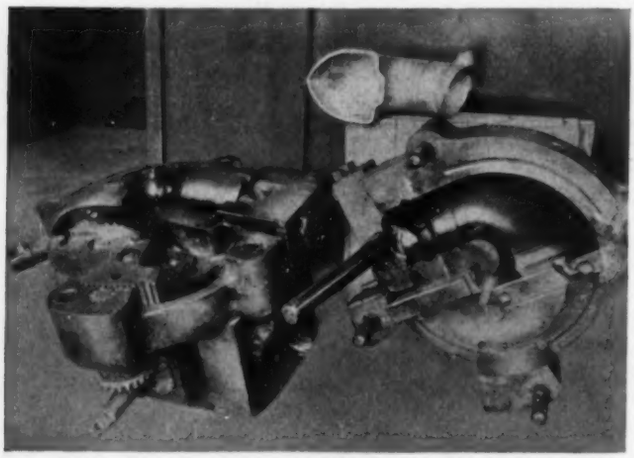
The side teeth on the milling cutter will tend to keep it free in the slot and promote easier cutting. Binding of the saw, or sticking caused by wear or cramping are responsible for the majority of failures in cutting-off operations.

A Problem in Die-Casting

HERBERT CHASE

A neat solution of what might be regarded by many as an unsolvable problem was recently developed by Frank N. Mariani of the Die-Casting Division of the E. A. Laboratories. It involved making a die for an aluminum casting that was bell-shaped and had a right-angle bend, such as the one shown. The casting was not to show any parting line between sections of the core forming the opening through the center.

For castings of this type, a floating core is ordinarily used to form the opening at the angle of the bend, the floating core being doweled to two other cores forming the opening at each end of the elbow and arranged for drawing straight out when the die is opened. The floating core remains in the casting until the casting is



removed from the die, and is then knocked out in a suitable fixture. Such a process is not only slow and awkward, but results in a circumferential fin at each side of the floating core. In this case, such a fin would appear at the parting line toward the bell-shaped opening of the casting.

As shown, the casting flares, increasing in diameter from the bend to the shield-shaped mouth. A study of the shape indicated that it might be possible to make a core that would swing through an arc, providing a center for its rotation could be located. Such a center was located, and it was considered feasible to make guides and an actuating mechanism that would move the core in the desired path. It then remained only to make a short, straight core for the small end of the elbow and to provide it with a pilot dowel to insure its correct position in relation to the swinging core. Such construction would eliminate the undesirable fin and would leave but one parting line between the cores at a point where it would not be seen.

The illustration shows how the problem was worked out. Having located the center for swinging the core, it remained to provide a pivot, a track and an operating mechanism. The core was mounted to slide in curved ways of the correct arc and was arranged for actuation by a pinion meshing with a gear segment. The pinion is mounted on one end of a shaft, while on the opposite end is a bevel gear meshing with a bevel pinion on a shaft having a squared end for a crank.

When moved into place in the die, the core is securely locked against movement by pressure from the injected metal and is sufficiently rigid in itself to hold its central position. The core at the small end is actuated in the usual way by a bent rod, or a cam, passing through an eye in the operating block and so arranged that the core is withdrawn automatically.

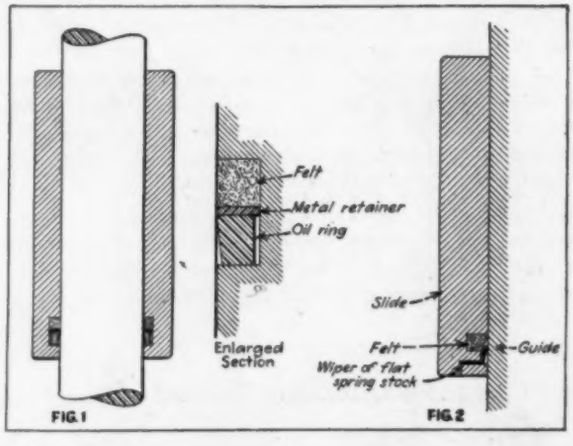
Such parts of the die as come into contact with the molten metal are made from a special grade of vanadium steel capable of resisting the high temperatures without rapid deterioration. Castings come from the die relatively clean and with but one internal fin, which is easily removed.

Keeping Vertical Slides Lubricated

ERNEST C. ALLEN

It is often difficult to retain lubricant between bearing surfaces of vertical slides. The oil creeps downward due to gravity, and besides being lost as a lubricant, often creates a messy condition at the point to which it drains.

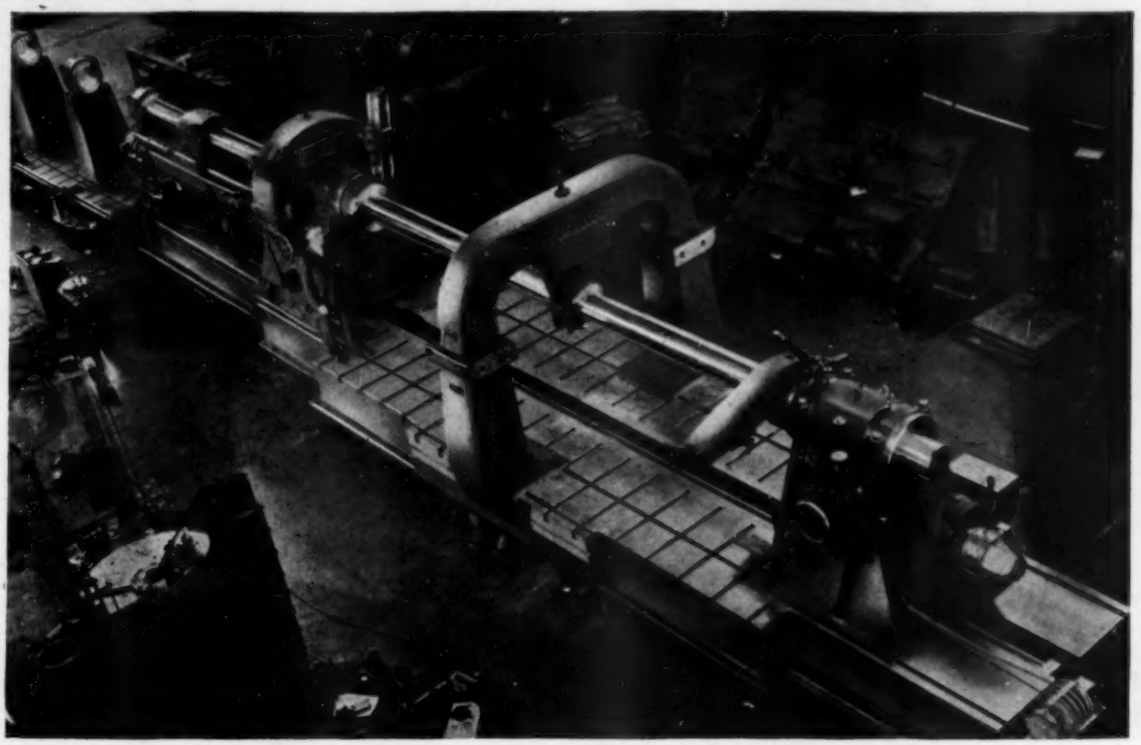
A method of decreasing this evil is illustrated. In Fig. 1 is a vertical slide in which the guiding member is a round bar. Near the bottom of the sliding member is a recess into which is fitted a ring that is taper bored, turned eccentrically and parted like a piston ring; a felt ring; and a thin metal washer to prevent the felt ring



from working down behind the oil ring and interfering with its free action. The upper edge of the oil ring hugs the guiding member closely. During the downward movement of the sliding member, the taper bore of the oil ring tends to slide over the oil film on the surface of the guiding member. During the upward movement of the sliding member, the sharp edge of the oil ring tends to scrape the oil film free. Oil accumulating ahead of the oil ring during the upward movement of the sliding member is absorbed by the felt ring.

In Fig. 2 is shown a method by which the same principle may be applied to flat or other non-cylindrical slides. In this case a wiper of flat spring stock is used.

SHOP EQUIPMENT NEWS

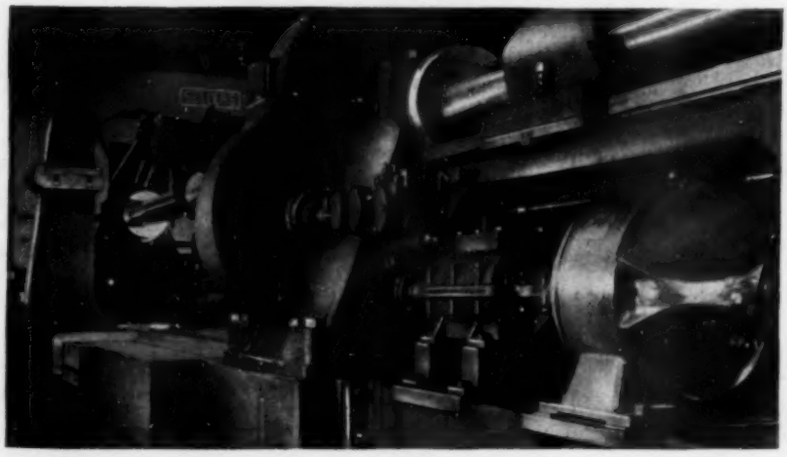


Sellers Cylinder Boring and Facing Machine

A SPECIAL cylinder boring and facing machine, largest of its type in the country, has been designed and built for the National Transit Pump & Machine Co., Oil City, Pa. It will bore and face, at one setting, the cylinders and guides of large engine and booster pump units. However, the machine, because of its flexibility, will take care of cylinders of almost any kind. It was built by William Sellers & Co., Inc., Philadelphia, Pa.

The largest cylinder that can be faced is 96 in. in diameter, and the maximum length of work that can be accommodated is 22 ft. The work table is 23 ft. long by 8 ft. wide, with the center of the boring bar 54 in. above it. Total length of the bed is 48 ft. 8-in., and the main section, a single casting weighing 80,000 lbs., is 36 ft. long. Weight of the complete machine is 162,000 lb.

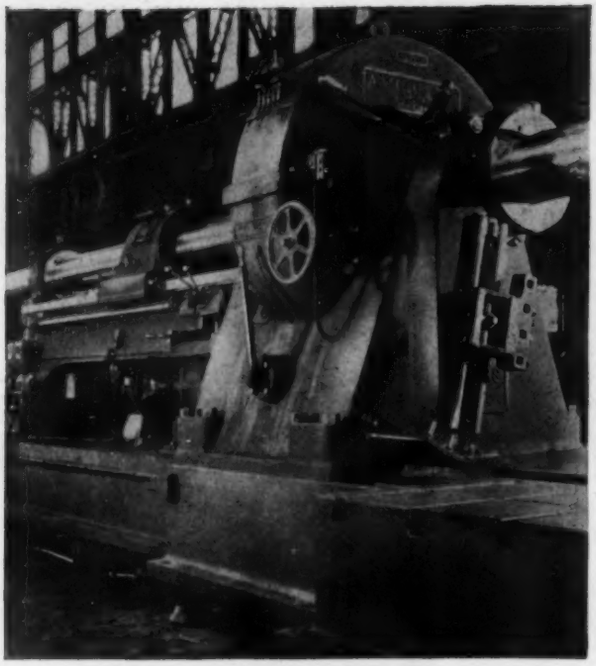
The boring bar is supported by two heads, one stationary and serving as a driving unit, the other, the tailstock, adjustable longitudinally on the main bed.



Each head has a heavy steel facing arm driven by the bar but mounted directly on a long stiff revolving sleeve in the head, through which the bar passes. A tool rest, with multiple tool slots for convenient setting, is carried on each arm and is adjusted on a radial line by a star feed mechanism. Locks, actuated by convenient levers, permit engaging and disengaging the facing arms even while the bar is rotating.

The bar is 43 ft. 8 in. long and 12 in. outside diameter, with a 6-in. hole throughout its length. It is bored at the working end to fit cutter head shanks or smaller bars. The bar has two full length key-ways 180 deg. apart, and is carried in and keyed to the long revolving sleeves in each head. Because the sleeves rotate in the heads, wear on the bar, due to rotation, is eliminated, although the bar can slide freely when being fed or traversed.

The bar is driven by a 40-hp., 3 to 1 motor through a speed-change box,



giving a 20 to 1 ratio or speeds from 1½ to 30 r.p.m. An intermediate gear train engages the main driving gear, a 60-in. herringbone, which is attached directly to the revolving sleeve in the fixed head, thus driving the bar.

The bar feed is also actuated by the main driving motor through positive gearing and a speed change box, giving three roughing and three finishing feeds in either direction. The stroke of the bar is 24 ft., in three bites of 96 in. each, and has automatic knockouts, adjustable to any position, to disengage the feed or traverse at either end of the stroke. Convenient hand adjustment is provided for the bar as well as power traverse operated by a separate 7½-hp. motor, giving a traverse speed of 16 ft. per min.

Feed and traverse are interlocked so that when the traverse push button is depressed the feed is automatically disengaged and is engaged again when the traverse button is released.

The tailstock or adjustable head is mounted directly on the bed. A 5-hp. traverse motor is mounted on the head and drives through reduction gears to a vertical pinion engaging a rack located in the center of the bed close to the guiding way.

A gallows support, which allows clearance on either side as well as clearance below the bar, is provided as an intermediate support when boring long engine bed assemblies. It is easily moved or relocated on the work table, and a series of lines and T slots facilitate squaring and setting up. If desired, the entire structure can be removed. Also, when setting up work it is only necessary to remove the upper portion.

Three auxiliary supports are also required to carry the bar when it is withdrawn at the rear. These supports, as well as the gallows support, are arranged with revolving sleeves to eliminate wear on the bar. They are provided with disappearing keys which depress when the bar enters and spring out to engage the keyways when the bar begins to rotate.

All parts moving continuously are oiled by gravity feed from conveniently located central tanks, except in the case of isolated bearings. However, gear boxes are oiled by splash and by conveyers so that a continuous flow of oil is maintained through the ball bearings and over the gears. When intermittent service is encountered, such as traversing the tailstock, a "one-shot" system is furnished, giving oil under pressure to the moving parts and sliding surfaces.

The three ball-bearing motors, as well as all other electrical equipment, are mounted directly on the machine. Power is delivered to the motor on the adjustable head through a taut cable wound up on a spring reel. Interlocking is provided for the feed and traverse motors, and limit switches prevent the bar from overrunning when either feeding or traversing.

Two operating positions increase the flexibility of the machine. The operator has full control at either head over all motors, and the bar can be started, stopped, traversed or fed in either direction, by hand or power, through duplicate levers and push-button stations.

Tinol Soldering Salts

Capable of penetrating grease, rust or paint and thus capable of permitting soldering of all metals with little or no preparation, these Tinol soldering salts are claimed to be particularly adapted for sheet metal work. They are available from American Solder & Flux Co., Wayne Ave. & Berkley St., Philadelphia, Pa. The material is applied as a powder, then heated. It will coat all metals, including brass, copper, sheet or cast iron, rustless steel, Monel metal, aluminum and other metals and their alloys. It can also be used for retinning or for repairing on old and corroded seams. These salts are claimed to penetrate underneath seams to permit soldering where it is now impossible, even with raw acid as a flux.

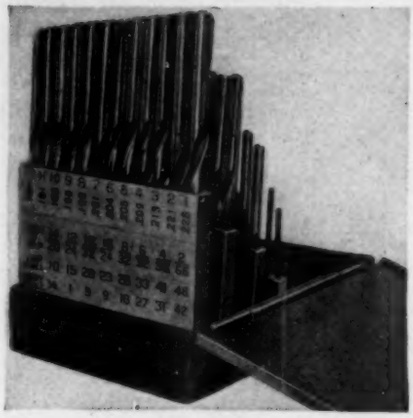
Cincinnati Geared Head Lathe With Timken Bearings

All sizes of Cincinnati geared-head lathes are now available with either bronze or anti-friction bearings. These lathes are manufactured by Cincinnati Lathe & Tool Co., 3207-3211 Disney St., Oakley, Cincinnati, Ohio. They are supplied with or without coolant pan and pump and in 2-ft. lengths of bed from 6 ft. up.

Not only the headstock is furnished with Timken roller bearings, but also other parts are anti-frictionized, including the gear box and apron. The lathe itself, described in *American Machinist* some time ago, has 12 mechanical spindle speeds in geometric progression and 32 feeds from 0.004 to 0.240 in. per revolution. These lathes are available with 24 speeds or 96 changes of thread and feed. The latter will cut any standard, odd, metric, right or left-hand thread. Motors in these units are mounted within the leg and are either a.c. or d.c. types, silent chain, endless belt, multiple V or direct-connected gear drive being available.

Union Twist Drills in Index Container

Union Twist Drill Co., Athol, Mass., is now marketing two drill sets in Huot index containers, described recently in *American Machinist*. It will be recalled that the index is a metal box into which the drill panels hinge and fold. Holes in the panels are individually drilled, and drill sizes equivalent to tap sizes are marked on the panels below each drill. Index set No. 118 carries carbon steel drills from $\frac{1}{16}$ to $\frac{1}{2}$ in. by $\frac{1}{64}$ in. in jobber lengths. Index set No. 119 carries carbon steel drills. wire gage, No. 1 to No. 60. High-



speed drills can be furnished if desired. The No. 118 set is 4 in. wide by 7 in. long by 1¾ in. deep, and the No. 119, 3¼ in. wide by 4½ in. long by 1 in. deep.

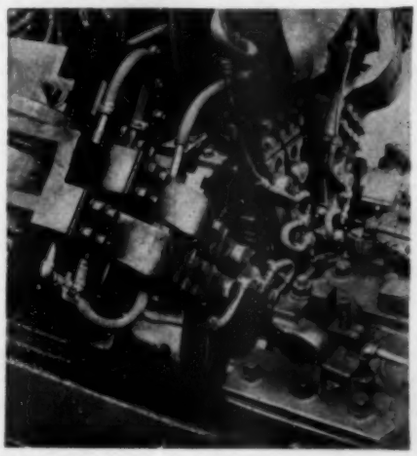
National Automatic Electric Header

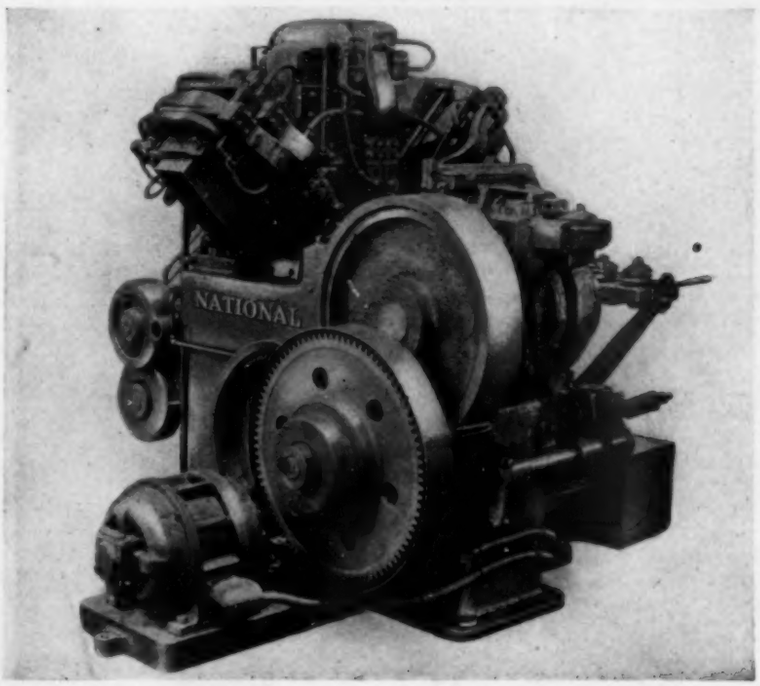
Combining heater and a header, this automatic electric header is built under the Kobert patents by exclusive license to National Machinery Co., Tiffin, Ohio. Cold stock, fed into the machine, is cut to length, heated to the necessary forging temperature by multi-stage electric heating, then headed.

Heating is localized and confined to the header portion. It is accomplished progressively in three stages, through low-voltage transformers. Heating is extremely fast, and the time interval between heating and heading is claimed to be so brief that there is little opportunity for scale to form. Thus the heads have good finish and physically and metallurgically have the quality of hot-headed work, while the shanks have a finish equivalent to cold-headed, solid-die work.

The machine can be arranged for feeding the stock from a coil or can be equipped with a magazine for feeding blanks cut to length. With a magazine feed it will head blanks which have been previously threaded or machined on the opposite end. Operation is automatic and continuous, a finished piece being ejected at every stroke.

The large view shows the machine from the driving side arranged for coil feed with the straightening rolls at the right. The close-up shows the heating terminals with the heading slide in the right foreground.





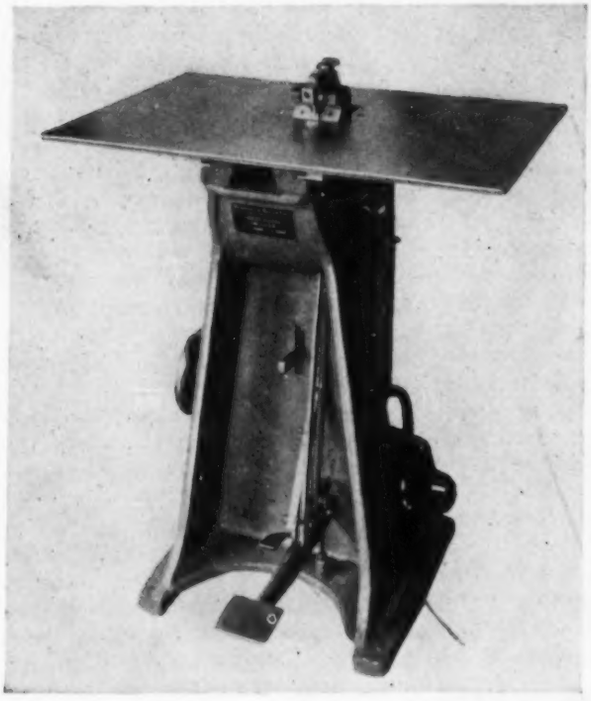
This machine, adapted for both steel and non-ferrous metals, is claimed to present these advantages: Alloy steels that cannot be successfully cold headed, because of fractures which develop, can be successfully headed by this process. In one stroke and with no annealing this machine will head non-ferrous metals which, when cold-headed, require two and three subsequent reheadings with an anneal before each. Work with large-diameter heads or heads of irregular shape which require excessive machining, when machined from bar stock, can be produced by this method with economy.

Sheet Metal Former

All types of flanging may be done on this sheet metal former. It consists of a short brake, 3 to 4 in. long, oscillating approximately 260 times a minute. The angle through which it oscillates is controlled by means of a treadle and may be varied from 0 to 100 deg. Metal to be worked is fed through a hold-down tool which clamps the metal during the up or working stroke of the brake and releases it during the down stroke to permit shifting the metal to a new position. The hold-down tool also forms the backing against which the metal is pressed in its final position.

The radius at the inside point of the hold-down determines the inside radius of the flange. The arc segment, extending from the hold-down through the brake, is a guide against which the metal is held. Its radius determines the height of the flange. Thus a different hold-down tool must be used for each different height of flange and a separate brake-tool is used for each hold-down.

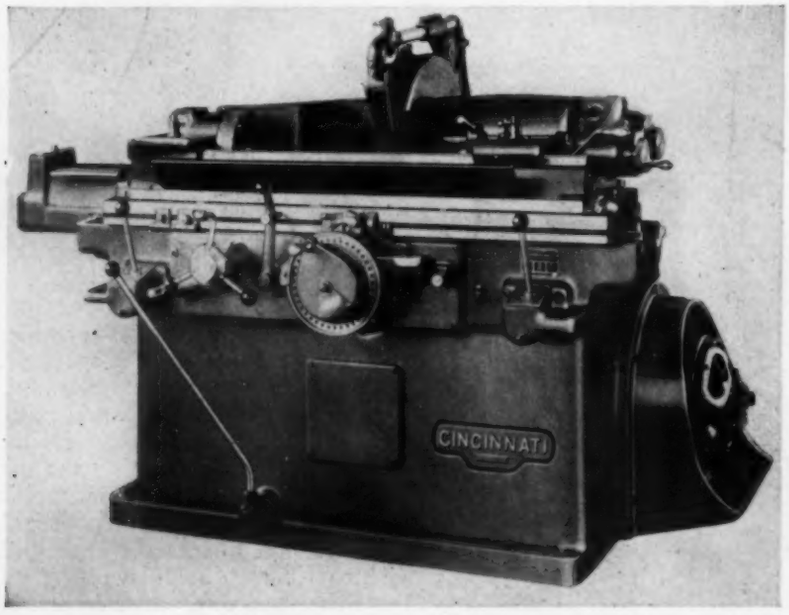
The machine, manufactured by



Engineering & Research Corp., 2014 Fifth St., N. E., Washington, D. C., comes equipped with ten sets of these tools which permit flanges of from ¼ to 1 in. to be formed. The brake and hold-down tools may be changed readily. The hold-down tool is held in a jig which has vertical and horizontal adjustments to compensate for differences in metal thickness. There is also a quick release which raises the tool over an inch to permit work flanged all around to be taken out of the machine. Speed varies with the type of work; usually it is from 2 to 10 times as fast as hand hammering over a form. No form is required, giving the machine value for production up to 1,000 pieces and for experimental work where only one piece is required. A templet is used to attain the sheet outline. Rights and lefts are made from the same templet by feeding the two pieces through in opposite directions. The machine will take from 0.12- to 0.083-in. stock.

Cincinnati Improved Saddle-Type Grinding Machine

A THOROUGH study of small center-type precision grinding machine operating conditions by Cincinnati Grinders, Inc., Cincinnati, Ohio, has shown a marked loss of productivity where relatively low grinding wheel power has been used with low swing capacity. Further, wide application of centerless-type precision grinding machines has shown that small diameter work, when properly supported, can be subjected to relatively high-horsepower grinding wheel load with a corresponding increase in production.



In the past, users have been compelled to buy machines with greater capacity than needed in order to obtain adequate horsepower. This led the company to the belief that there is a demand for saddle-type grinding machines with increased distances between centers and greater swing which corresponds to horsepower rating. Consequently, the company has introduced 6- and 10-in. saddle-type machines with greater distances between centers, the latter having 10-in. swing and 10-hp. motor for the grinding wheel. Other improvements include a long hand lever placed conveniently near the operator's left hand, which starts and stops the table traverse, workhead rotation, and flow of cutter coolant. The main drive 10-hp. motor mounting is improved by substituting a shoe-type bracket which permits use of standard motors with feet. This bracket is so arranged that the motor can be swiveled rapidly out of position to facilitate fitting of new Texropes on the drive. Headstock gearing has been improved by substitution of spiral gearing for worm gearing. Spiral gears operate or run in a bath of oil, giving greater smoothness to the drive. The bed and saddle have been strengthened to resist vibration. Grinding wheel lubrication has been bettered to lessen the number of necessary spindle adjustments.

The following general features are claimed to make these new saddle-type grinding machines valuable: Adequate power, which reduces the actual grinding time; convenient control, which reduces machine manipulation and work handling time; and lower maintenance costs because of high factor of safety built into all mechanisms, especially the grinding wheel and workhead spindle.

The 6-in. machines are built with 18 and 30 in. distance between centers, while the 10-in. machines are arranged with 18 and 36 in. distance between centers.

Esterline-Angus Graphic Recording Instruments

Several innovations are included in the complete line of graphic recording instruments announced by Esterline-Angus Co., Indianapolis, Ind. Spring clocks which drive the

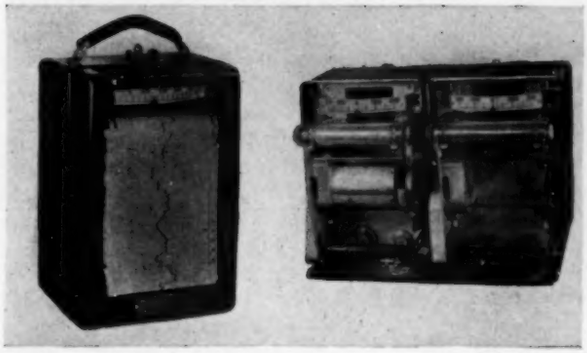


chart are composed of removable units, comprising escapement, spring barrel and gear train. These interchangeable clock units can be quickly replaced in the field. Also all three springs in the clock are wound at one time by means of a simple crank and from the front of the meter, permitting closer spacing of the instruments. Also all instruments are arranged so that the rolls which drive the chart can be coupled together to synchronize the charts. The coupling is placed back of the gears which fix chart speed so that different-speed instruments can be coupled.

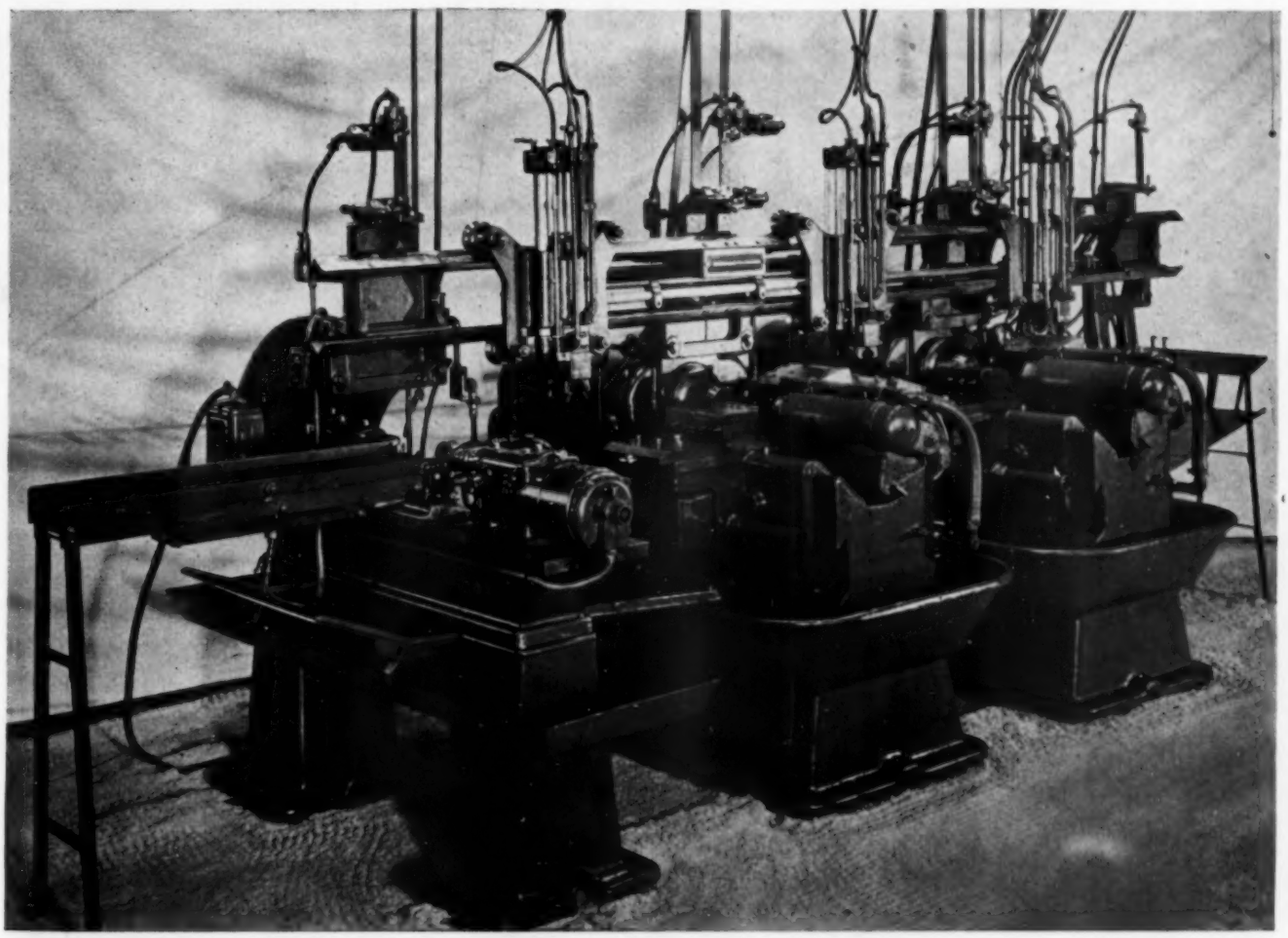
A complete assortment of electrical synchronous motor clocks is also available for driving the charts. Both these and the spring clocks give chart speeds ranging from ¾ in. per hour to 12 in. per minute. Another innovation is a variable speed motor which operates at slow chart speed when values measured are steady but speeds up instantly to 3,000 times the slow speed when sudden and rapid changes are to be recorded. When conditions again become normal, the chart is reset to the proper time, and slow speed is resumed.

The new instruments are made in portable, switchboard flush, switchboard front and wall-type cases. All but the portable are made in double or twin types, which consist of two recorders in one case some 22 different instruments in 924 variations are offered. These instruments are used for checking up power consumption and in determining motor capacities for machine tool drives.

Seneca Falls Automatic Loading Device

ARRANGED so that a sequence of operations may be performed without the use of manual labor, this automatic loading device has been developed by Seneca Falls Machine Co., Seneca Falls, N. Y., to handle a job on an automobile steering gear sector shaft. The rough forgings are snagged and cut to length by an operator who also supervises the three machines illustrated. After the forgings have been cut to length the operator places them on the conveyor at the left, which carries them to the centering machine. They are then picked up by fingers and carried to the rough turning machine and placed between centers ready for turning. Simultaneously another set of fingers picks up the forging that has been rough turned and places it in the finish turning machine, while another set of fingers removes the finish turned piece and delivers it to the loading chute at the right.

The three machines incorporated in this set-up consist of an automatic centering machine, made by the use of



two Kingsbury heads and two standard Model U automatic Lo-swings. While the work is being machined these machines operate just as any standard machines would. After machining, carriages return to the starting position, and spindles stop. At this point the automatic loading arrangement is thrown in by switches placed on the machines.

The sequence in operation of loading is: Fingers are lowered and grip the work: tailstock spindles are withdrawn; fingers lift work; heads carrying fingers traverse to the right to positive stops which locate each individual head in respect to the machine being served; work is lowered; tailstock spindle advances; fingers open; fingers are lifted. When all heads are clear, machines are started and heads traverse to the left ready to repeat cycle.

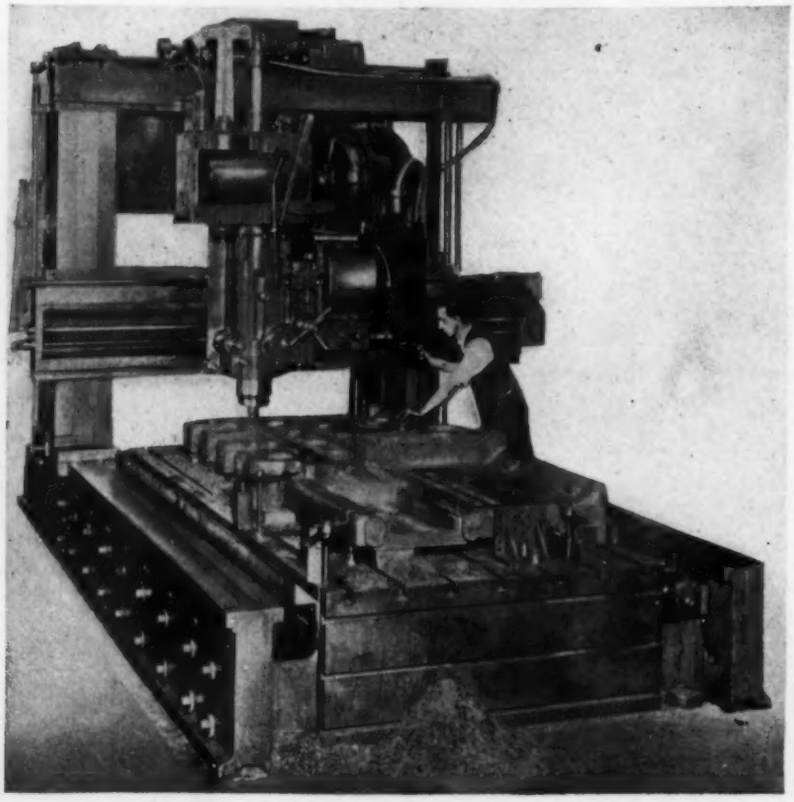
Various movements of the loading mechanism are obtained hydraulically, there being a cylinder and piston for providing the longitudinal or transverse movement and cylinders for raising and lowering the gripper fingers. Tailstock spindles are also operated hydraulically. Oil reservoir, pump and electrically operated control valves are contained in a separate unit. Control of the various movements of the loading device is obtained through electric switches which operate solenoid valves. The control is so arranged that the completion of each movement starts the next, thus the automatic loading is always in time. For example, in removing a piece of work from the machine the fingers first come down and grip. Closing of the fingers on the work makes a contact which actuates the tailstock spindle to withdraw the center. When the center has receded a proper distance it makes a contact which causes the heads to raise. This arrangement makes it impossible for the unit to get out of time.

On this particular job one operator snags, cuts to length, centers, rough and finish turns 93 pieces per hour. Actual machining time is about that with machines manually operated, total production being increased because of continual operation. The loading device and its variations are protected by patents.

Sleeper & Hartley Universal Milling Machine

A VERTICAL-SPINDLE milling machine, different from the usual types and claimed to operate on an entirely new principle, has been placed on the market by Sleeper & Hartley, Inc., Worcester, Mass. As the name implies, the machine is entirely universal in operation in that it is capable of finishing five surfaces of work without changing the position of the piece on the table. Milling operations can be performed on any of these surfaces and holes in the vertical plane may be bored, drilled or tapped under power.

In outward appearance, the machine resembles some of the planer-type millers, but the table is stationary and the housing with its rail and spindle head travel over the work on ways. The fixed bed is claimed to reduce required floor space about 30 per cent over that required by the planer-type unit of the same capacity. The vertical spindle of the machine is mounted in anti-friction bearings and takes the standard spindle end. The box-type base is cast in one piece with internal bracings to increase rigidity. Side frames are also of box section and are gibbed to the track and provided with binders to prevent possible lifting. They are adjustable for wear.



The cross-rail is of a deep section to provide necessary strength and stiffness, yet the rail extends some distance beyond the frame to allow maximum head travel. The cross-tie is also wide and deep to add to stiffness and provide positive alignment.

All feeds on the machine are motorized, two motors providing power. The traveling head may be fed in any direction and has a wide range of speeds. The traverse operates in either direction and is interlocked with the vertical feed. Since it may also be operated independently of the longitudinal feed, it is possible to cross-traverse or cross-feed while the head travels lengthwise of the table.

The cross-rail is also power-actuated and once positioned is held in place by a clamp operated from either side of the machine. All electrical controls are ready accessible and are of the pushbutton and controller-box type, while gear shifts are provided on either side of the machine. Cross-feed controls are located at the head itself.

The spindle is driven by a 4-speed,

10-hp. motor mounted on the same frame as the spindle and moving with it, the connection being by direct worm gear. By means of a back-gear arrangement, lever-controlled, eight spindle speeds may be obtained. A separate 7-hp. motor mounted on the top cross-tie provides power for all feeds and motion of the heads, speeds of travel being obtained through a gear shift. Housings are moved along the ways by a screw.

Specifications are: Distance between housing, 6 ft. 2 in.; maximum height of cutter, 50 in.; vertical travel of spindle, 15 in.; capacity of machine, 14x8 ft.; floor space, 20x13 ft.; table area, 12x5 ft. 2 in.; and weight, 45,000 lb.

Spindle speeds range from 16 to 49 r.p.m. on the back-gear; 102 to 307 r.p.m. on direct gear. Spindle feeds are from 0.001 to 0.270 in. per revolution of the spindle. Housing feeds on direct gear are from 0.002 to 0.406 in. on direct gear and from 0.0015 to 0.305 in. per spindle revolution on reverse gear.

Two smaller machines of this type have capacities of 4x4 ft. and 6x8 ft., the extreme height of the cutter in both cases being about 45 in.

Canedy-Otto 12-Speed Spindle 3- and 4-Ft. Radial Drills

IN ADDITION to the 8-speed radial drill recently announced (Vol. 76, p. 685) the Canedy-Otto Manufacturing Co., Chicago Heights, Ill., has also developed a 12-spindle unit in the 3- and 4-ft. size. This machine is larger and heavier than the 8-spindle one, has an 11-in. column, and the head saddle incorporates a number of design refinements over the less expensive model. Like the other, it incorporates a 4-speed induction motor, controlled by a drum-type contactor mounted on the side of the saddle. The back gear with single-lever control provides eight additional speeds for heavier cuts.

Push-button control with reversing station is standard. It enables the operator to stop the spindle instantly, and the reversing station makes it possible to use this drill for tapping, with approximately ten reverses per minute. Should the drill be desired for use as a tapper, a special motor can be furnished giving as high as fifty reverses per minute, with the reversing speed twice that of the forward.

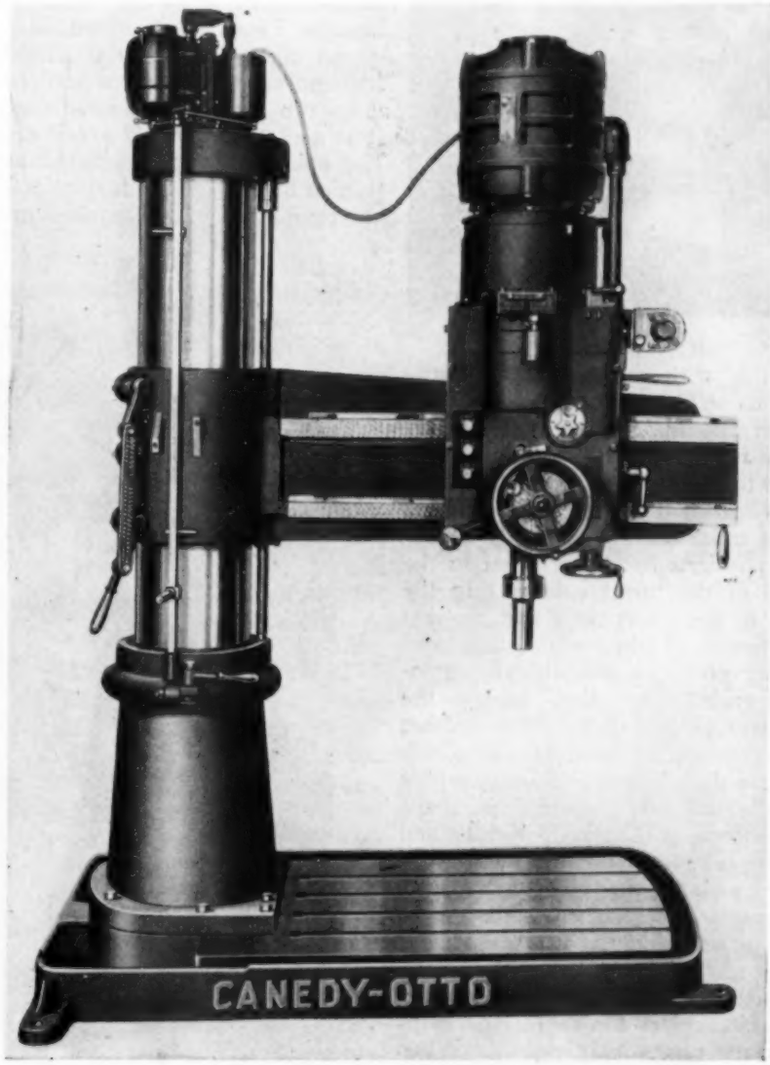
Six feeds are provided through an alloy steel, heat-treated gear train. Feed rates can be changed while the machine is in operation, and a ratchet-feed clutch lever makes it possible to disengage the feed mechanism for hand feed. A large graduated dial gives an accurate reading depth gage, and an automatic trip bar is provided for self-feed operation.

Two sets of Timken roller bearings support the spindle, which is made from a chrome-nickel steel forging and operates in a 2¾-in. diameter steel sleeve. All other rotating parts are also on anti-friction bearings. Seventeen ball bearings and two Timken roller bearings are on the saddle power unit alone. All bearings in the gear housing are double row, designed to carry heavy loads at high speed. Annular ball and Timken tapered roller bearings support the column and make its movement easy. The head saddle itself is carried on a row of balls traveling on a hardened and ground steel way, and these balls are relieved when the saddle is clamped.

Vertical movement of the arm is

SPECIFICATIONS FOR 3-FT. MODEL

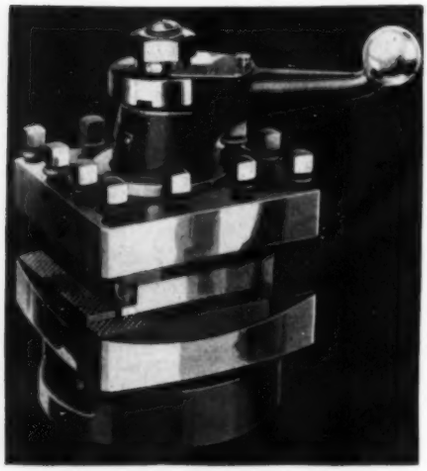
Diam of drill circle, in.	72
Diam. of column, in.	11
Max. distance from spindle to base, in.	52¾
Min. distance from spindle to base, in.	12¾
Min. distance from spindle to column, in.	8
Traverse of spindle, in.	10
Diam. of spindle at nose, in.	2¾
Traverse of head on arm, in.	28
Traverse of arm on column, in.	30
Spindle speeds with 1,800-r.p.m. motor,	28-1,800
Spindle speeds with 1,200-r.p.m. motor,	20-1,220
Feed per rev. of spindle, in.	0.005 to 0.035
Box table dimensions, in.	24x22x20
Max. height of drill, in.	117
Height of base, in.	6
Working surface of base, in.	36x43
Floor space required for full sweep of arm, in.	98x98
Net weight, lb.	4,425



effected through an individual motor mounted on top of the column, with safety trips top and bottom for limiting its travel. A double clamp mechanism locks the arm when drilling. There is also a lever for the column clamp.

Improved McCrosky Turret Toolposts

Redesign to incorporate several improvements has been undertaken in the turret toolposts manufactured by McCrosky Tool Corp., Meadville, Pa. The fundamental design of the indexing mechanism has been retained, i. e. a corrugated or tooth bearing surface on the under side of the turret body



meshing with complementary corrugations on the stationary base of the turret column. This mechanism provides for 12 indexing positions.

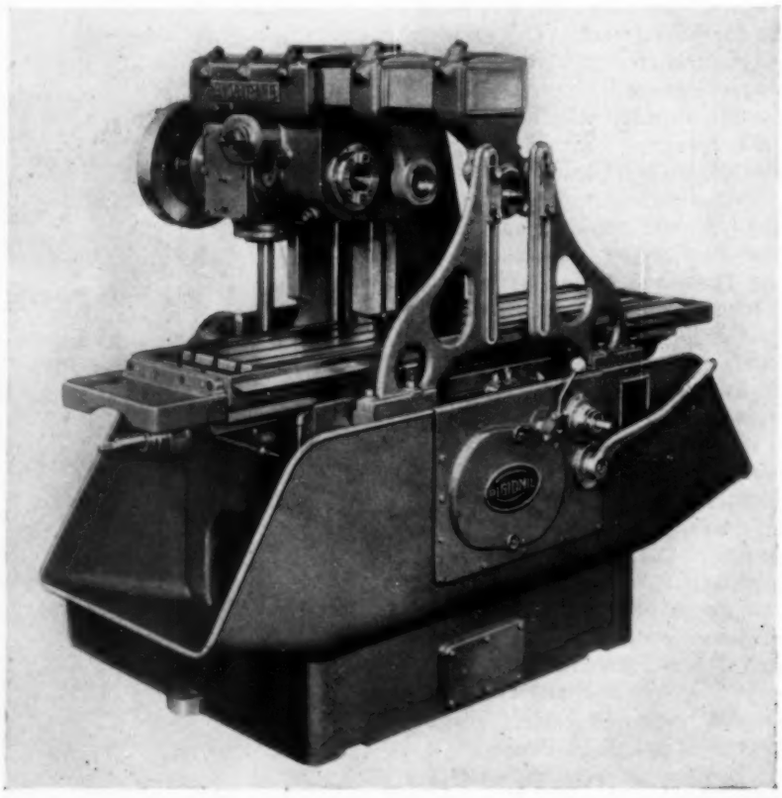
In the new design a hardened steel sleeve with 12 vertical grooves in exact axial relation to the 12 indexing positions has been added to the stem of the turret column. In the hole of the turret body that receives the stem of the column are two spring plungers, diametrically opposite each other, that engage the grooves of the sleeve. The ratchet effect produced by these parts aids in rapid indexing. The clamping handle has been modified in shape to conform to the type of handles and levers used on modern lathes. It is fitted with a spring plunger that rides against a cam attached to the top of the turret column. This cam has a right angle recess. When the handle is in the closed position the plunger presses against the recess and helps lock the turret body rigidly. When the operator has finished with one tool, he pushes the handle away from him a quarter turn. This carries the plunger out of the recess in the cam and also raises the handle and the body on the column until the corrugations of the body clear those on the column base. It can then be turned freely to bring the next tool into operating position. Ample lubrication of all moving parts is provided. The handle is fitted with a dust collar to prevent dirt from working in between handle and body. The body has a skirt to prevent chips from working in between the corrugated surfaces of the indexing mechanism.

The turrets are made in five standard styles: A 4-way turret bolted to the bolt circle of the compound rest; a 4-way turret with a carriage base to replace cross-slide; a 4-way turret that fits the T-slot of the compound rest; a hexagon turret bolted to the bolt circle; and a hexagon turret with a carriage base. Each of the five styles can be furnished in three sizes for various sizes of lathes.

Sundstrand Improved No. 3-B Rigidmil

ALTHOUGH it retains all the elements of the basic design of Rigidmils now in operation, the No. 3-B machine incorporates a number of features in keeping with modern production methods and the introduction of the new cutting alloys. The machine is made by the Sundstrand Machine Tool Co., Rockford, Ill. A special high-speed drive is available for application to the standard head at any time, bringing the spindle speed from a maximum of 241 to 668 r.p.m. The spindle now has selected antifriction bearings throughout as standard equipment. An increased range is also available for the feed box, which is made larger and heavier. It incorporates centralized controls for clutch, feed and head elevation as previously. The spindle can be mounted either horizontally or vertically, and special heads have been designed to meet varying requirements.

The spindle head has been completely redesigned. A more powerful main drive through a vertical spline shaft is provided. The elevating screw is heavier and the mounting is improved, making it more accessible. The quill adjustment is more convenient, and the method of



SPECIFICATIONS OF NO. 3-B RIGIDMIL

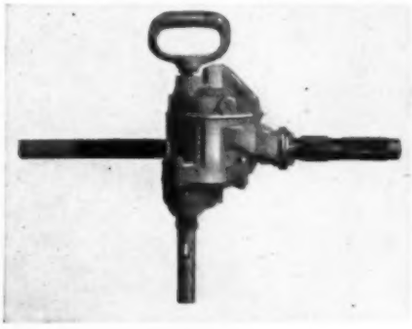
With Horizontal Spindle	—Reciprocating Tables— 1400 Series	1800 Series
Table travel, in.	24-30-36-48-60	24-30-36-48
Height — Table to floor, in.	32 and 34	32 and 34
Working surface of table — 24-in. feed	14 x 52	18 x 52
30-in. feed	14 x 58	18 x 58
36-in. feed	14 x 64	18 x 64
48-in. feed	14 x 88	18 x 88
60-in. feed	14 x 100	.....
Feed range, in. per min., low series	½ to 20	½ to 20
Feed range, in. per min., high series	¾ to 41	¾ to 41
Number of feeds by pickoff gears (6 furnished)	50	50
Spindle speed range — Regular r.p.m.	17 to 241	17 to 241
Spindle speed range — High speed r.p.m.	47 to 668	47 to 668
Number of speeds by pickoff gears (6 furnished)	48	48
Cross adjustment of spindle, in.	3½	3½
Center of spindle to top of table, min., in.	3½	3½
Center of spindle to top of table, max., in., (24 to 36 in. table feeds)	16	16
Center of spindle to top of table, max., (48 to 60 in. table feeds)	14	14
Center of spindle to under side of overarm, in.	7	7
Motor — 1200 r.p.m. — hp	5 to 10	5 to 10
Speed of drive shaft, r.p.m.	400	400
Overall height of machine, in.	62	62
Floor space, in.	48 x 71	52 x 71
Total weight, lb.	5,700 to	8,500

With Vertical Spindle — Rotating Tables	1800 C Series	2400 C Series
Diameter of working surface of table, in.	18	18 and 24
Longitudinal adjustment of table, in.	5	8
Clearance — Center of table to face of column, in.	13	17
Table feed at edge of table, in. per min.	1 to 28	1 to 30
Rapid traverse, in. per min.	141	149
Face of spindle to top of table — Min., in.	4½	4½
Face of spindle to top of table — Max., in.	11	11

clamping the spindle head has been simplified. The Sundstrand rectangular overarm is preserved, but the overarm braces, clamps and mounting have been modified to obtain greater rigidity.

The table can be reciprocating (6 lengths, 2 widths) or rotary, with continuous feed or alternating feed and automatic rapid traverse. At each end are convenient tool trays. The feed screw is larger and stronger and an anti-backlash nut is available as extra equipment. A sheet steel guard protects the table-control dogs, and the feed trip mechanism that they engage has been strengthened. Standard rapid traverse rates are practically doubled.

The one-piece frame casting has been completely redesigned. A larger coolant reservoir and chip screen is provided, and more space is available for removal of chips.



CP No. 315 Rotary Drills

A group of "Power Vane" tools which employ no pistons, toggles or crankshafts and are claimed exceptionally powerful for their light weight and recommended for drilling, reaming, flue rolling and tapping, particularly in close quarters, has been announced by Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. The unit is claimed to have the same power in both forward and reverse. A safety lock is provided on the throttle handle that prevents change in direction of rotation unless the lock is released by the operator. The drill is balanced to assure smoother operation and prevent vibration. A replaceable hardened steel cylinder liner is used. Complete lubrication for the motor is effected by a line oiler in the housing, and grease fittings are provided on the gear and governor cases. Ball bearings are used throughout. Both reversible and non-reversible units are included. Through-bolts and studs are used to increase strength and permit easy repair. Governor control is on the intake air supply which maintains the free speed, as well as reducing air consumption on the power side, and back pressure on the exhaust side. The small spindle offset permits ease of operation in close quarters work.

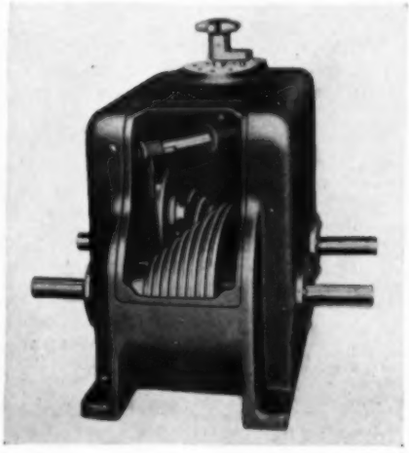
The reversible units are available in sizes with drill capacities from ½ to ⅞ in.; chuck from ½ to 2 M.T., and light speeds from 1200 to 350 r.p.m. Minimum distance from the side to the center of spindle in each case is 1¾ in., and over-all length varies from 14½ to 16⅜ in. The weight is 15 lb.

The non-reversible units are available in the same size range with weight at 14½ lb. Breast plate and chuck or No. 2 Morse taper spindle, spade handle or feed screw instead of breast plate, or No. 1 Morse taper spindle are interchangeable.

General "Multi-Speed" Transmission

A line of "Multi-Speed" change boxes using the Gibbs' V-disk transmission has been announced by General Radial Drill Co., 1765 Elmore St., Cincinnati, Ohio. High efficiency, long life and low upkeep costs are claimed by the company. No slippage occurs in the transmission because the idler disk sets up a wedging action in direct proportion to the load it transmits. Speed changes are simply and positively made by means of a star knob on top of the unit.

The grooved cones are of steel and



are mounted on steel shafts supported by ball bearings. The composition disk runs as an idler between the cones and is the only part to wear, except the ball bearings. The transmission proper runs dry. Shaft ball bearings are the only points for lubrication, and these may be lubricated easily from outside. Ratios may be had in eight speed changes up to 9 to 1 and in sizes from ¾ to 10 hp., inclusive.

Barnes Hydraulically Reciprocated No. 194 Honing Machine

CAPABLE of honing all diameters, from 4 in. down to ¾ in., the smallest size honing and lapping diameters less than ¾ in., this No. 194 single-spindle, single-speed honing and lapping machine is of light design and has simplified hydraulic equipment for spindle reciprocations without dwell or shock. Its manufacturer claims it to be comparatively low in price and yet with great utility for a limited range of light work. It has maximum and minimum stroke of 8 in. and about ½ in. respectively. It is manufactured by Barnes Drill Co., 814-830 Chestnut St., Rockford, Ill., and embodies the company's self-oiling all-geared construction with anti-friction bearings throughout.

The six-splined spindle and telescopic sleeve extension are of chrome-nickel steel, heat-treated and hardened. All gears are of alloy steel, heat-treated. The six splined spindle is driven by six-splined hub running on two Timken roller bearings. The machine is furnished geared to any one speed of spindle rotation desired, and the hydraulic control will be adjusted at factory for one rate of spindle feed or reciprocations, both rotations and reciprocations being figured as best to suit the job.

To facilitate lift-out the spindle is equipped with telescoping extension sleeve (Morse Taper No. 4 is standard unless some other method of mounting the hone is required). This sleeve has approximately 5 in. of travel and may be locked at the upper position to hold the hone out of the work or locked at the lower position to locate the hone in the cylinder and hold it in the extended position during the working stroke.

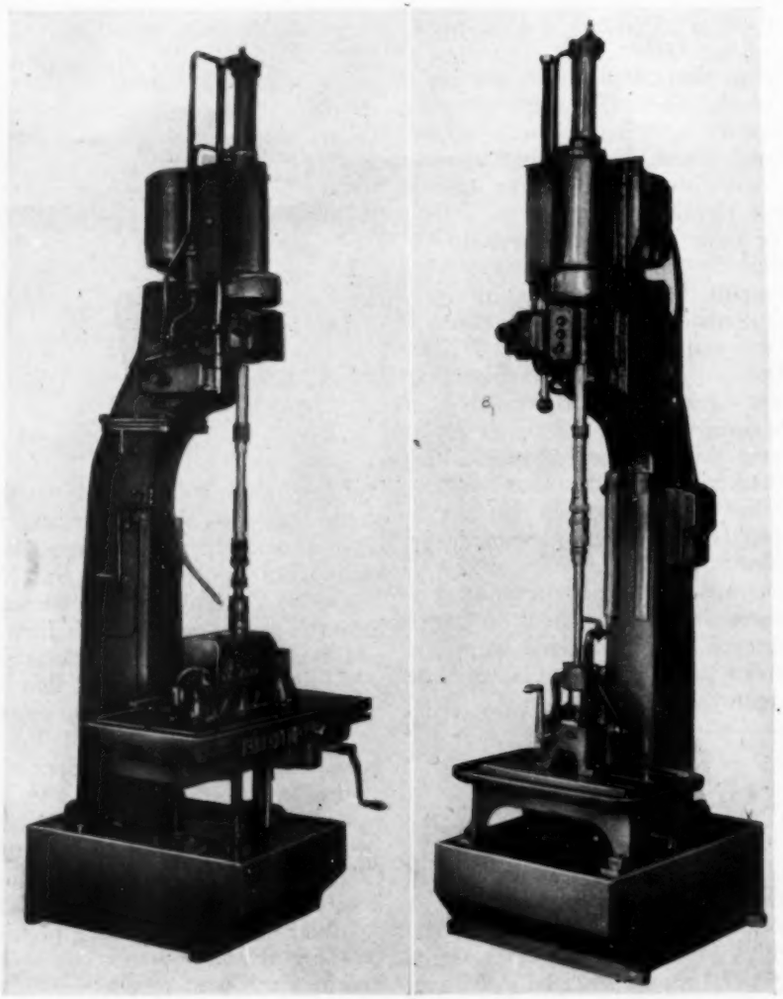
The machine at left in the illustration is under electrical pushbutton control and has an indexing table with lateral movement for convenience on a series of honing jobs, such as in a small automobile block. The machine at right has a solid one-piece frame, set up for honing of small bores in bodies for geared pumps. The quick-acting fixture illustrated is on a different type of fixed-height or box table. Another style of table, the regular raising screw type, raising and lowering on column ways, much like a drilling machine table, is also available. The base includes compartments for coolant reservoir and filter. The coolant pump is mounted in the column and is shaft driven. The top of the base has covers for compartments and two crosswise finished bosses upon which

SPECIFICATIONS FOR NO. 194
HYDRAULIC HONER

	Inches
Height of regular machine to extreme top	112½
Distance, center of spindle to face of column	10½
Distance, top of base to floor	12½
Maximum distance from top of base to nose of spindle	48½
Minimum distance from top of base to nose of spindle	40½
Maximum distance spindle to table (solid box type)	40½
Maximum distance spindle to table (raising screw type)	39½
Minimum distance spindle to table (raising screw type)	8½
NOTE: Above dimensions do not include 5-in. lift-out.	
Telescoping spindle extension provides lift for removal of hone from cylinder. (Lift-out may be of travel to suit job.)	
Standard length, approximately	5
Diameter of 6-splined spindle driving end	1¼
Spindle stroke, any desired setting	½ to 8
Spindle speed: Any one speed desired.	
Peripheral feet per minute recommended	200 to 300
Cycles of reciprocation adjusted through valve control to suit job.	
Type of drive: Direct connected; standard ball bearing motor for vertical application. 2 hp., speed 1,800 r.p.m. recommended.	
Floor space, front to back, width	34x28

WEIGHTS

	Net	Crated (Pounds)	Boxed
Net weight, without motor, but with rectangular raising screw table	840	1,300	1,500
Net weight, with motor and starter and rectangular raising screw table	1,140	1,400	1,600

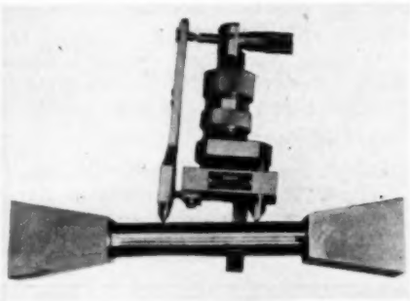


a fixture may be mounted if the table is not supplied. No fixtures are furnished. A 2-hp. motor drive is recommended, at a speed of 1,800 r.p.m.

Oxweld Extensometer

A precision instrument, so sensitive that it will indicate the elongation in a standard A.S.T.M. test specimen occasioned by the heat of the human hand, this Oxweld extensometer makes it possible to determine the yield point of specimens being tested in tensile testing machines. Although highly sensitive, it is claimed to be simple, rugged, self-contained and self-compensating.

The two points of the extensometer are clamped on the specimen in such



a manner that the elongation between the two points during tension is multiplied in a ratio of 5-to-1 by a lever bar making electrical contact with the micrometer head. The moment of contact is indicated by the flash of a small electric light in the head. This makes it possible for a single operator using a tensile testing machine in combination with the extensometer to determine both the ultimate strength and the yield point of a specimen. To determine yield point it is only necessary to back off the micrometer head two complete turns (0.050 in., which allows for the 5-to-1 ratio in the lever bar) from the zero reading (the point at which the electrical contact is broken) for the specimen and apply the load, increasing the tension until the light flashes. This flash indicates that the yield point has been reached, and this may be read from the load indicating device on the tensile testing machine. The instrument may also be used as a strain gage to determine elongation of a specimen under a specific load. It is manufactured by Linde Air Products Co., 30 E. 42nd St., New York, N. Y.

Chapmanizing

Claimed as a radically new method of case-hardening steels, "Chapmanizing" has been announced by the Research Department, Chapman Valve Mfg. Co., 203 Hampshire St., Indian Orchard, Mass. In principle the new process is a form of hardening by which ordinary carbon steels can be case-hardened to a depth of approximately 0.025 in., the case thereby produced being hard enough to scratch glass with ease. Parts so treated are claimed to be practically impervious to wear and abrasion.

Osborn Tramrail Systems

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio, which organized a new Materials Handling Division in June, 1931, has just announced the first installations of the new equipment. The systems include the following equipment: T-rail and beam rail of patented design; fittings for all ceiling conditions; switches, cross-overs, turntables, etc.; Yale & Towne chain blocks; Shepard electric hoists; new type trolleys; cranes and transfer bridges; complete electric and hand-propelled systems; miscellaneous auxiliary equipment.

The T-rail and beam rail are one-piece, rolled steel rail sections of simplified design to permit easy erection and permit unusually low head room. Systems are available in capacities up to 6,000 lb. A punch press application is illustrated.

Norin Mechanical Riveter With Automatic Feed

A mechanical riveter with automatic hopper feed is offered by the Norin Engineering Co., 335 Union Park Court, Chicago, Ill. Rivets are fed from a hopper through a chute to a stake inserted in the riveter frame. On the stake the rivets are moved step by step until inserted into

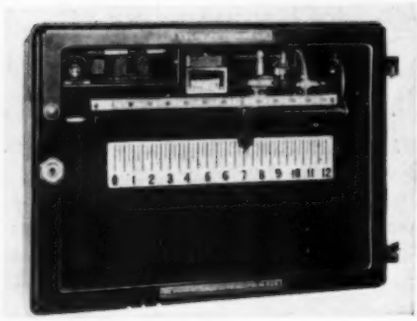
a pair of holding fingers directly under the riveting dies. The rivet shank protrudes above the fingers and locates the work.

The machine illustrated is capable of driving steel rivets up to $\frac{5}{32}$ in. in diameter. Power is exerted through a toggle and lever action arranged to

create a long uniform pressure zone regardless of changes in the riveting grips. The pressure developed may be adjusted by a screw at the rear of the mechanism to accommodate different sizes of rivets. Through a special clutch the forward motion of the upper die ceases as soon as the maximum pressure is reached.

Brown Indicating Potentiometer

Most indicating potentiometers hitherto have required hand balancing. This indicating potentiometer by Brown Instrument Co., Philadelphia, Pa., is of the self-balancing type and is also claimed to offer many other outstanding advantages. Among these are an unusually long (40-in.) slide wire, positive spiral shaft drive, a non-slip clutch, a secondary pointer definitely fixing the size of step in moving the slide wire contact, interchangeable case for universal mounting, mechanism swingable out of the case for easy inspection without interference with operation, mer-



cury-in-glass switches in control models, automatic thermal equalization between cold junction terminals and compensation coil. A big scale with large figures, calibration marks and pointer is used to permit accurate reading at a considerable distance. As a pyrometer the instrument can be supplied for any range from 0 to 100 deg. F. up to 0 to 3,000 deg. F.

• PATENTS •

MAY 24, 1932

Metal-Working Machinery

Rotary Shearing Machine. Chester M. MacChesney and Ralph H. Norton, Chicago, Ill., assigned to Acme Steel Co. Patent 1,859,336.

Centerless Grinder. Henry James Hoeg, St. Clair Shores, Mich. Patent 1,859,443.

Arrangement on Lathes and Other Machine Tools with Drive by Hydraulic Stepless Gearings. Malte Ritter, Magdeburg, Germany, assigned to Magdeburger Werz - Zeugmaschinenfabrik A.G., Magdeburg, Germany. Patent 1,859,715.

Grinding Machine. Waldo J. Guild, Worcester, Mass., assigned to the Heald Machine Co. Patent 1,859,737.

Metal Extruding Apparatus. David L. Summey, Waterbury, Conn. Patent 1,859,753.

Feed Slide for Interchangeable Drill Heads. David C. Klausmeyer, Cincinnati, Ohio, assigned to The Cincinnati Bickford Tool Co. Patent 1,859,778.

Straightening Machine. Ralph C. Stiefel, Elwood City, Pa. Patent 1,859,851.

Pipe Threading Machine. Ira W. Nonneman, Warren, Ohio, assigned to The Borden Co. Patent 1,859,882.

Metal Extrusion Press. Oswig Schlenstedt, Mulheim - Ruhr - Speldorf, Germany, assigned to Hydraulik Gesellschaft mit beschrankter Haftung, Duisburg, Germany. Patent 1,859,990.

Apparatus for Feeding Metal to Shearing Devices. Florence C. Biggert, Jr. Crafton, Pa., assigned to United Engineering & Foundry Co. Patent 1,860,340.

Tool and Attachments

Device for Assembling and Dismantling Die Sets. Kasimir Janiszewski, Milwaukee, Wis., assigned to Superior Tool & Die Co. Patent 1,859,446.

Fixture for Rebabbitting Locomotive Crossheads. Frank Prince, East Gary, Ind. Patent 1,859,464.

Means of Extruding Metal Tubes. John Wycliffe Leighton, Port Huron, Mich. Patent 1,859,707.

Pilot Support for Reamers. George Elmer Moen, Kelso, Wash. Patent 1,859,836.

Reamer Shaft Holder and Feeder. George Elmer Moen, Kelso, Wash. Patent 1,859,837.

Turning Ring Bearing for Machine Tools. August Schlegelmilch, Dusseldorf, Germany, assigned to Schiess-Defries Aktiengesellschaft, Dusseldorf, Germany. Patent 1,859,989.

Feed Device. Hans Huber, Zurich, Switzerland, assigned to Firm P.F.A.G. Patentverwertungs & Finanzierungs-Aktiengesellschaft, Zurich, Switzerland. Patent 1,860,033.

Welding Apparatus. Verni J. Chapman, Schenectady, N. Y., assigned to General Electric Co. Patent 1,860,172.

Furnaces

Metal Treating Furnace. Charles T. Willard, Roselle and Richard Kaier, Cranford, N. J., assigned to The Singer Manufacturing Co. Patent 1,860,065.

• TRADE PUBLICATIONS •

ACID - RESISTING EXHAUST FANS. Duriron Co., Inc., Dayton, Ohio, has issued Bulletin No. 166 on "Duriron Exhaust Fans," which covers only the engineering and mechanical features of that company's fans and their installation. It includes photographs, drawings, and tables of specifications. No attempt is made to discuss the physical and chemical properties of the metal itself, which is described in Bulletin 150.

GENERATORS. General Electric Co., Schenectady, N. Y., has issued Bulletin GEA-1607, superseding GEA-433A, describing direct-current generators and exciters, Type B, from 1 to 2 kw.

TRANSFORMERS. Wagner Electric Corp., 6444 Plymouth Ave., St. Louis, Mo., has issued a 54-page bulletin on the types of distribution transformers manufactured by the company. Wagner construction features are profusely illustrated and described in detail. The bulletin is known as No. 172, and is in loose-leaf form.

WELDING ROD. Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill., has issued a booklet, "RegOroD for Uniformity," describing the electrodes, fluxes and other welding material supplied by the company.

EDITORIALS

June 2, 1932

K. H. CONDIT • F. H. COLVIN
Editors

Danger in Long Commitments

Purchasing agents and other officials who direct the placing of contracts for materials and parts these days are keeping a watchful eye on markets. They sign up for immediate needs only, while prices are on the way down, alert to take advantage of any further drops as they occur.

Materials and parts suppliers will do well to keep an equally watchful eye open for the first sign of an upturn. Otherwise they are likely to find themselves obligated to supply considerable quantities of their product at a price below the cost of production.

This warning may sound a trifle academic just now, but we are among those who believe that improvement is not far distant, now that the constructive forces of the country are beginning to show signs of coordinated efforts.

Encouraging Workers to Protect Themselves

One reason for the reluctance of workmen to wear goggles, respirators and other protective devices is, according to one who has studied the situation closely, the disbelief of the management in their efficacy. Put in the plant because demanded by safety codes, managers who were graduated from the shop before safety became a real issue are likely to minimize their importance, or at best to give them but half-hearted support.

Educating the worker as to the value of eye and lung protection is believed to be the way to secure general use of protective devices. One method, advocated by the authority quoted, is to have the manager and visitors wear goggles or respirators when going through plants in which the men are supposed to wear them constantly.

In too many cases, signs regarding fire hazards caused by smoking are ignored by the management and visitors, and this has a distinct effect on the men. In shops where these are observed by the men higher up, there is much greater cooperation by the men in the ranks. The same result can probably be secured with the wearing of goggles and other protective devices.

There is such an increase in the number of law suits for damages relating to respiratory diseases that it is important for management to consider the question seriously. Anything that will encourage men to protect themselves is well worth while, and nothing is more effective than a good example.

Small Production and All-Around Men

In these days when automobile production lines are working more or less intermittently and the cost of special machines is being carefully scrutinized, shop executives who are responsible for results are sighing for a few skilled mechanics of the old school. When it come to precision work, the old timer never did a better job than we get today, probably not as good. He didn't have the fine tools. But for doing intricate jobs without special equipment, the specialist isn't so good and the shop executive stands the grief in both cost and output.

As long as buyers crowded the salesrooms and the cost of special machines could be recovered in a few months, the specialist filled the bill. Now that tool costs are being carefully watched and new models come out frequently in the hope of stimulating sales, the all-around man is at a premium. This upholds the contention of apprentice advocates that trade training is more necessary than ever, and that if it is neglected, all industry will suffer.

No one dreams that the specialist will give way to the all-around mechanic of former days. But it is probably that a better training in the funda-

mentals of machine work, in learning how work is done on different machines and that it can be done almost without machines when necessary, will be a part of apprentice training in the future. With a foundation that will enable him to tackle any machine job in the shop, the bright boy can become a better specialist if it seems best for him and for the industry. He will also be better equipped to handle a more responsible job than as though his knowledge were limited to a single machine.

• CHIPS •

Warm weather and the call of party politics are accomplishing what the pleas and protests of the country failed to do . . . Congress at last shows signs of winding up its legislative procrastination . . . of overcoming its fear of minority groups and balancing the budget . . . Senate retains tariffs but bars export debenture from tax bill . . . Sales tax regains favor as present plan falls short of needed revenue . . . House would concur if passed by Senate . . . Three different relief plans vie for favor . . . sponsored by House, Senate and Administration respectively . . . cause of dissension: "Should public works be self-sustaining?" . . . From the sidelines, Al Smith says it makes no difference . . . would finance program with beer tax . . . Democrats organize to force bond issue . . . Goldsborough bill shelved for a week . . . Los Angeles attorney, J. L. Scott, picked to nominate Hoover.

America's sweet tooth seems unaffected by the business slump . . . candy eating resists the general decline . . . 11.78 lb. per capita eaten in 1931 equals boom year consumption . . . $16 spent by the average family on sweets.

Reconstruction groups planned for all large cities . . . similar to Committee of Twelve . . . Newspaper publishers at White House pledge support to plan . . . Meanwhile N. Y. group announces arrangement with banks to underwrite home financing as its first move . . . U. S. Steel sees new outlet for 3,600,000 tons annually in building homes . . . and they need not preclude individuality says Bennett Chapple of Armco . . . In 1931, U. S. made 78.6 per cent of World's automotive products . . . Ford lost $53,000,000 but is still $655,000,000 ahead . . . Americans fly 18,000,000 miles a year at night . . . 40 per cent of total mileage, while European figure is 3 per cent . . . 246,840 citizens to train at military camps this summer.

Latest figures from the United Action Drive to put 1,000,000 to work are 836,445 men employed . . . in 3,003 towns and cities.

Governor Ritchie assails Federal loans to industries . . . cites failure of Farm Board in agricultural endeavors . . . Excessive post war tariffs are chief bar to prosperity, League of Nations' experts find . . . free flow of trade and money halted by protectionism . . . Shorter working hours is solution given by A. F. Whitney, president of Trainmen's Brotherhood.

French plan monthly flights between Senegal, French West Africa, and Natal, Brazil . . . to pave the way for more frequent service in 1933 . . . Sixteen European nations sign moratorium refunding pact for $250,000,000 . . . 42,498 houses are under construction in England and Wales as against 36,815 last year . . . 100,000 building workers active in 10,000 communities . . . Trend in British migration is reversed . . . in 1931, more returned to native land than left for dominions . . . Hitler group is ignored in German coalition cabinet . . . Volga to be dammed in huge Soviet power project . . . 200,000-kw. hydraulic plant planned . . . 10,000,000 acres of land will be irrigated . . . Russia is the greatest potential export market for U. S. automobiles . . . Germany now gets bulk of the business . . . Soviets building steel balloon to trap rare air . . . to take scientists 12½ miles skyward.

May auto output of 195,000 is 33 per cent over April . . . largest production since last July . . . further increase seen for June . . . Parts makers increase payrolls . . . Murray Body adds 2,000 men bringing force to 6,000 . . . working five and six days a week instead of two or three . . . Stutz launches new models . . . Ethyl gas engineers find high-compression motors need more cooling . . . use soapsuds for lubricant to increase efficiency . . . 600 m.p.h. is the theoretical limit of airplane speed, wind tunnel tests show . . . at that point, wing resistance becomes so great that sufficient hp. cannot be supplied to overcome it . . . Dirigible Akron leaves California on way back to Lakehurst . . . B. & O. to meet $35,000,000 in notes due August 10.

· REGIONAL · REPORTS ·

LAST WEEK we pointed to New England as the section where activity might first get under way. This week we are able to report that some of the smaller shops there are busy, and this holds true of the Milwaukee district also. Observers feel that when a pick-up comes it will start with the smaller enterprises and spread to the larger industrials. Just now the large concerns are in no position to commit themselves to any program but waiting because of the uncertainty of the political situation and the tax program that Congress will eventually pass. In the interim, nothing can be expected but further restriction in most quarters. The automobile industry continues to gain in small car sales. It remains to be seen whether buyers are trying to get in before the imposition of taxes or whether a larger market can be developed later. Meanwhile, industry in general chafes under the indecision of Washington and hopes for an end of it soon, good or bad.

NEW ENGLAND finds little prospect of a change for the better in the general situation, although it reports orders by Amtorg, the Navy and automobile interests. New York is entirely flat and is desperately holding on. Cincinnati discovered few sales and no indication of early buying from the inquiries coming in. Milwaukee finds that the situation hinges upon the automobile industry. Tool and die shops report improvement. Philadelphia finds little prospect of an immediate change and believes that little buying will come from the railroads. Detroit is a bit more optimistic as the race between the small-car builders becomes more acute and new lines are about to come on the market.

NEW YORK—Without a doubt the past week has been the worst experienced in many years by local dealers. Sales were almost negligible and of little value. Inquiries were of no consequence. Large industrial concerns that have developed household products for which at least some re-tooling would be expected have definitely abandoned any idea of making purchases at this time. What will develop in the immediate future cannot be guessed at because of the entire lack of a discernible trend. The only thing of interest during the week was a Navy list carrying the following items: motor-driven bench-type drill press, motor-driven vertical turret lathe, portable sanding machines, geared-head lathe and bench-type buffer and grinder—for distribution to various stations.

NEW ENGLAND—The current week produced little to awaken optimism or stimulate buyer interest. Orders are still being placed by Amtorg and the Navy Department with the automotive industry buying a machine or two as needed. Inquiries are few and many of these seem to be regarded by the trade as feelers.

The situation, however, is somewhat better this month. While large interests are quiet, it is somewhat cheering to observe a number of small metal-working plants on full time and overtime schedules.

The report published last week to the effect that a number of Brown & Sharpe screw machines had been purchased by a screw company is denied.

CINCINNATI—Business of manufacturers is confined to sales to scattered general machinists and miscellaneous users. Selling agents ferreted out a small order here and there among users in local and adjacent territory, and developed an occasional prospect. There were a fair number of inquiries, but they did not show any strong indication of buying.

PHILADELPHIA—Business here continues at low ebb, with little prospects of immediate change for the better. Decision of an upstate firms to broaden its output, which would result in some sizable purchases of equipment, is still held in abeyance, with slight prospect of an early decision. Continued decrease in personnel of the railroads, gives little hope there will be any activity from that source in the immediate future.

DETROIT—There is some likelihood of a slight improvement of conditions here during the summer. Several car manufacturers are making plans to bring out new models, and it is likely they will be obliged to do considerable re-tooling. How much new equipment they will buy is problematical. Most of them have plenty of equipment now and there is no tendency to make expenditures that can be avoided. If anything the atmosphere of rigid economy is more noticeable than even it has been for the last 18 or 20 months.

MILWAUKEE—Dullness continues in the machine tool market, but flashes of interest may be discerned. Betterment seems contingent mainly on progress of automobile makers, with electrical industry the next best prospect. Tool builders are designing low-cost, high-production special machines, but these hardly yield substantial volume. Tool and die shops report some improvement, considered a forerunner of greater activity in smaller metal-working shops.

MATERIAL TRENDS AND PRICES

Scrap metals of all kinds, together with furnace coke, declined appreciably during the last week. Copper also dropped ¼c. per lb., to 5¼c. Zinc and tin, on the other hand, advanced slightly in the principal markets. The decline which began a week ago in fabricated brass and copper apparently has halted. Steel quotations, however, continue to hold despite slackness of orders.

(All prices as of May 27, 1932)

IRON AND STEEL

Pig Iron —	Current	Mo. Ago	Yr. Ago
Birmingham, No. 2, Fdry., per gross ton	$11.00	$11.00	$12.00
Buffalo, No. 2, Fdry., per gross ton	16.00	16.00	17.00
Heavy Melting Steel Scrap — Pittsburgh consuming point, No. 1, per gross ton	9.00	9.75	10.30
Furnace Coke — Connellsville, per net ton	2.15	2.25	2.40
Foundry Coke — Connellsville, per net ton	3.25	3.25	3.25
Steel Shapes — Pittsburgh, base, per 100 lb.	1.60	1.60	1.65

Iron Machinery Castings — Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight, 275 lb:

Chicago....4.62½	Cleveland....4.50	New York....4.75	
Cincinnati....4.35	Detroit....4.00		

Steel Sheets — Prices in cents per lb., del. from warehouse stock (except at Pittsburgh) in lots of 401 to 999 lb., ordered and released for shipment at one time:

	Pitts. Mill	Chicago	Cleveland	New York
Hot-rolled, No. 10	1.55	3.20	3.00	3.00
Hot-rolled, No. 24*	2.20	3.55	3.25	3.50
Galvanized, No. 24	2.85	4.10	3.75	4.00

*Annealed

Seamless Steel Tubing — Cold-drawn mechanical tubing, round, .10 to .30 carbon, in lots of less than 100 ft. or 100 lb., net, at N. Y. warehouse:

Thickness of Wall		Outside Dia. in Inches						
		½	⅝	¾	⅞	1	1¼	1½
Inches	B.w.g.	Price per Foot						
.035	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23

Shapes, Plates, Bars, Etc. — Warehouse base prices in cents per lb., del. in lots of 401 to 999 lb., ordered and released for shipment at one time:

	New York	Cleveland	Chicago
Bands	3.40	3.00	2.95
Bars, soft steel	3.10	2.75	2.75
Cold fin., flat or square	3.80	3.60	3.60
Cold fin., round or hexagon	3.30	3.10	3.10
Cold rolled strips	4.95	5.95	5.50
Floor plates	4.85	5.00	5.00
Hoops	3.75	3.55	3.50
Rivets	4.00	3.30	4.00
Shapes	3.10	2.95	3.00
Spring steel	4.00	4.00	4.00
Tank plates	3.10	2.95	3.00

Stainless Steel — Hot-rolled bars, base, Pittsburgh, 0.12 per cent carbon, cents per lb.:

Chromium 15% and under....19.00	Chromium 18 to 23%....23.00
Chromium 15 to 18%....20.50	Chromium 23 to 30%....28.00

Bolts and Nuts — Discount from list, f.o.b. mills, Birmingham, Chicago, Cleveland and Pittsburgh, on bolts (except stove), nuts, and lag screws, mill lots.... 75%

NON-FERROUS METALS

Prices following are in cents per lb. for mill shipments in carlots:	
Aluminum ingots 99%, N. Y.	23.30
Copper, electrolytic, Conn	5.25
Copper wire, base, Chicago and Cleveland	8.12½
Copper wire, base, N. Y.	8.00
Lead, pigs, E. St. Louis	2.90
Tin, Straits, pigs, spot, N. Y.	21.10
Zinc, slabs, E. St. Louis	2.60
Prices following are in cents per lb., base, N. Y., Chi. and Cleve.:	
Brass rods, high	9.75
Brass sheets, high	12.00
Brass tubing, high	15.25
Copper, drawn round	12.37½
Copper sheets	14.87½
Copper tubing	14.37½
Prices following are in cents per lb., del. from N. Y. warehouse:	
Babbitt, anti-friction, general service	27.00
Babbitt, com'l, intermediate grade	32 75
Babbitt, genuine, highest grade	43.00
Solder, bar, 40-60	16.00
Prices following are in cents per lb., base, Huntington, W. Va.:	
Monel metal rods, hot rolled	35.00
Monel metal sheets, full finished	42.00
Monel metal tubing, seamless	65.00
Nickel rods, hot rolled	45.00
Nickel sheets, full finished	52.00
Nickel tubing, seamless	75.00

Scrap Non-Ferrous Metals — Dealers' purchasing prices in cents per lb., f.o.b. cars:

	New York	Cleveland	Chicago
Heavy yellow brass	1.75	1.25	1.50
Light brass	1.25	1.00	1.25
No. 1 rod-brass turnings	2.00	1.75	1.25
Heavy copper	3.62½	2.50	2.62½
Light copper	2.75	2.25	2.12½

SHOP SUPPLIES

(Prices at warehouse)	New York	Cleveland	Chicago
Abrasive disks, aluminum oxide No. 50 grain, cloth, 6-in. dia., X weight, in 150-disk lots, per 100	$3.48	$3.48	$3.48
Belting, leather, heavy	40–5%	40–5%	40–5%
Belting, rubber, trans., Grade I	60–10–10%	60–10%	60–10%

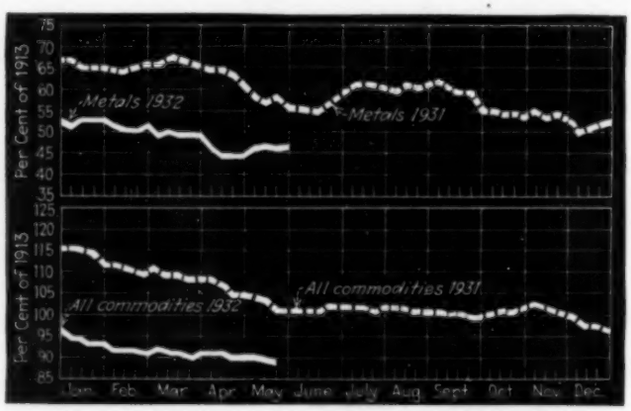
Lumber — Per M ft., b.m., 12–16 ft. lengths, delivered, N. Y.

Crating — Southern pine:

1x4-in., sq. ed..... $27.00 1x6-in..... $24.00

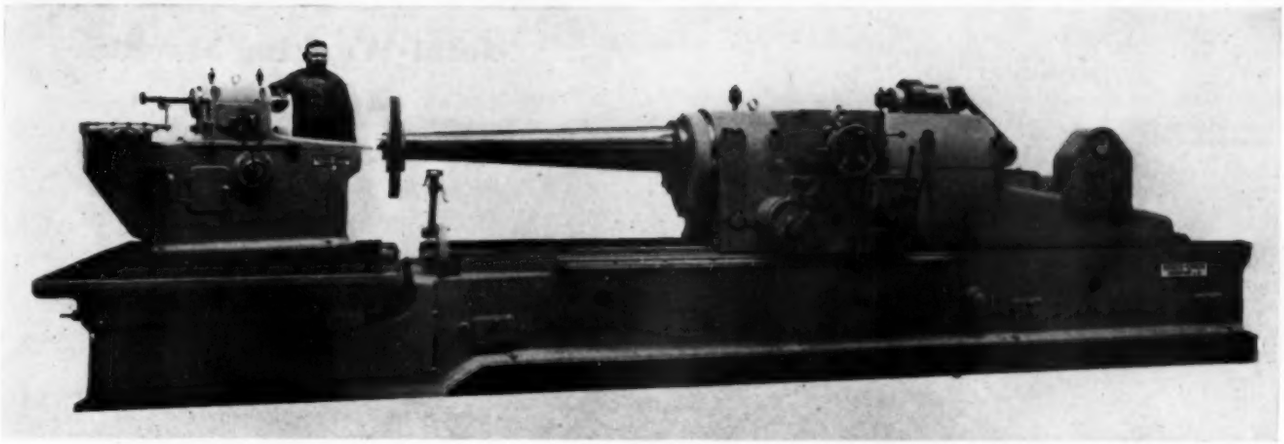
Skids — Spruce:

2x4-in..$35.00 3x4-in..$35.00 4x6-in..$37.00 6x6-in..$50.00


Per Cent of 1913
Metals 1932
Metals 1931
All commodities 1931
All commodities 1932
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

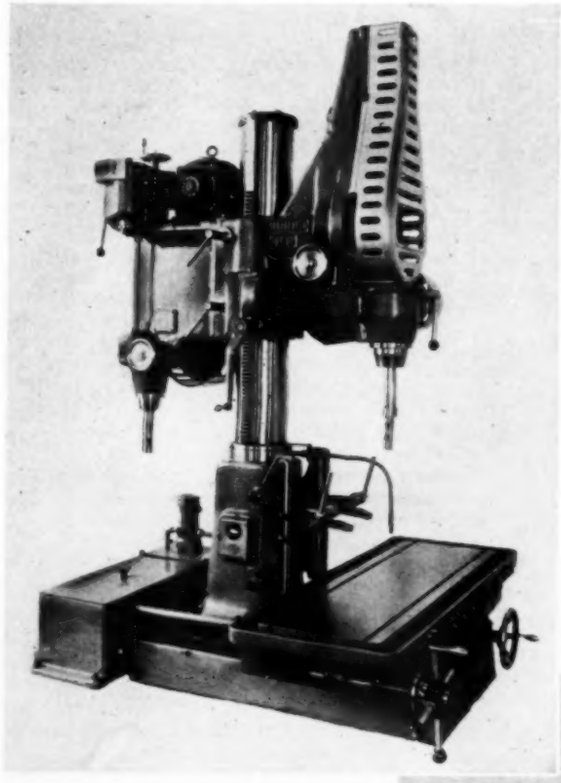
Price Movements Week by Week

Average Price of Raw Metals: Pig Iron, Billet Steel, Copper, Tin, Lead, Zinc—American Machinist
Seventy-Four Commodities Index—The Annalist

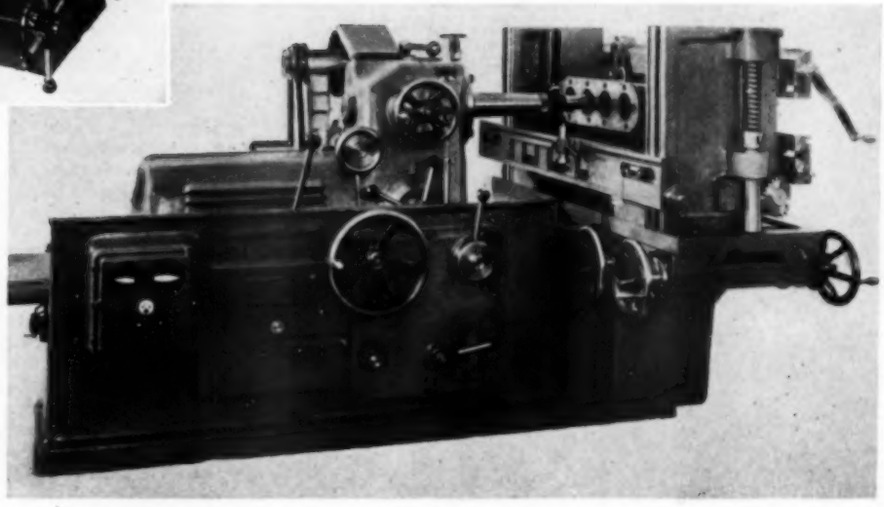


This internal grinder with planetary spindle motion is one of the largest in the world. Made by Naxos-Union, Frankfort-am-Main, it is intended for holes 117 to 225 in. in diameter and up to 860 in. deep. All working movements, circular, planetary and longitudinal, are made by the spindle, the work remaining stationary. 42 hp. is required for the drive, weight is about 35 tons. Compare its size with the cylinder grinder on the table.

Metal-Working Machines at the 1932 Leipzig Spring Fair

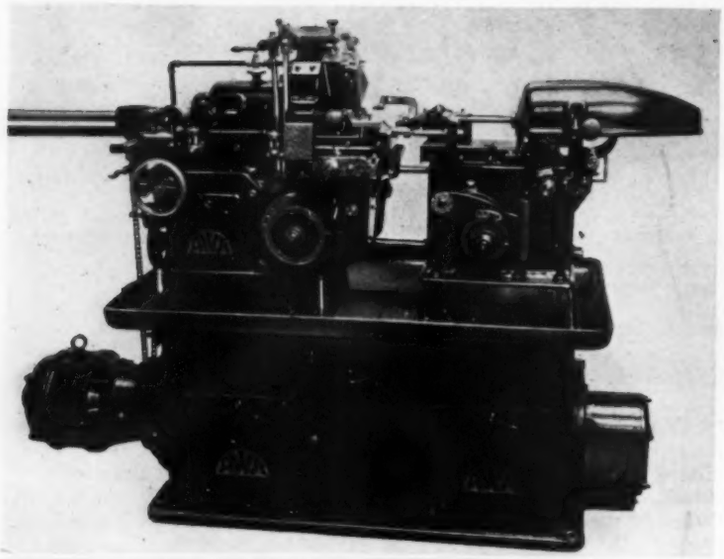


Left—Ready centering of the tools without an adjustable table is provided in this Kellenberger honing machine with vertically adjustable and pivoted arm. Boring and honing heads can be swung into position alternately on the turret principle. Four speeds range from 30 to 100 r.p.m., nine feeds from 0.004 to 0.048 in. per spindle revolution. The feed lever also operates the rapid return automatically. Feeds are changed while the machine is running

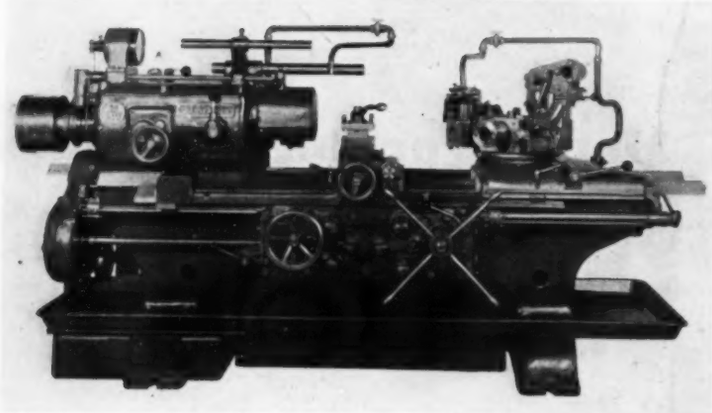


Right — Chiefly intended for internal grinding of automobile cylinder blocks, this hydraulic fine grinding and honing unit has sufficiently heavy bearings to permit its use for rough boring before grinding and buffing afterward. Only one setting is necessary. Feed changes are made hydraulically. Shown by Kellenberger & Cie. St. Gall, Switzerland

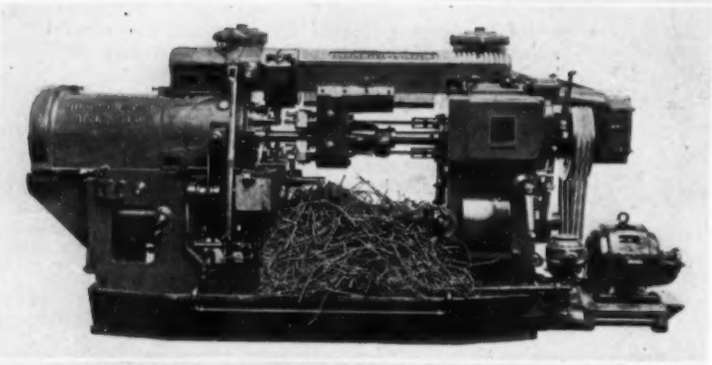
Metal-Working Machines at the 1932 Leipzig Spring Fair



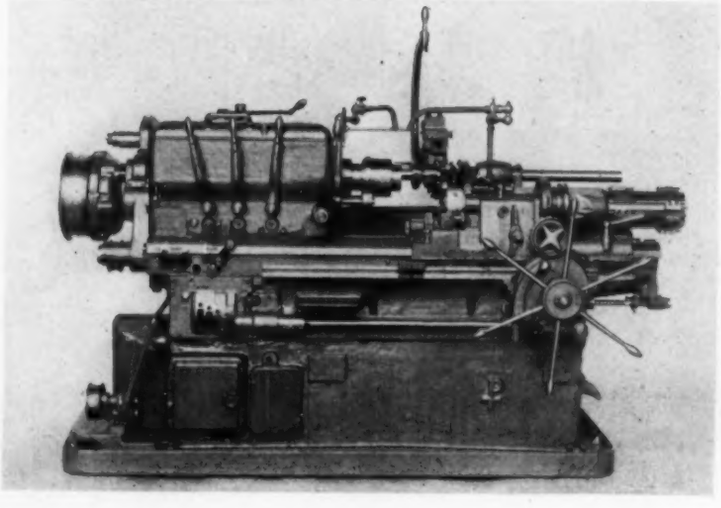
Simplicity of operation and of speed changes is provided by the arrangement of gearing in this high-capacity automatic profiling machine, shown by Automatonwerke Steinhäuser, Feuerbach-Stuttgart. Cam arrangement is modified so that with the same cam holes and various-depth settings, different bar lengths may be machined. Normally, eleven tools are used, although thirteen may be applied. Work is fed forward by compressed air, and in some cases held in a pneumatic chuck



A hydraulic headstock, instead of the usual gears, is provided on this turret lathe, shown by Maschinenfabrik Magdeburg. Spindle speeds may be regulated steplessly during cutting, and bar work up to 5¼ in. in diameter and 6½ ft. long can be handled. All control levers are centralized at the middle of the bed. Slide covers are provided, and in the companion geared-head model, any of the 18 spindle speeds can be attained while the machine is running



Over-arm construction adapted to this portal-type automatic, shown by Gildemeister & Cie, Bielefeld, permits free falling of chips and increases rigidity. The guide ways for the tool saddle are on the bottom of the over-arm, away from chips. Single-spindle and 4-spindle automatics shown by Hasse & Wrode, Berlin, have an upper and two traverse tool carriers in addition to the turret proper, to increase capacity



A wedge-actuated chuck and a special stopping device for the spindle are incorporated in this turret lathe by Pittler A.G., Leipzig-Warren. The 16-tool turret heads are interchangeable, cams are easily accessible, internal and external thread-chasing tools are provided. Drive is from a single pulley through a gearbox in the headstock

U. S. Metal-Working Machinery Exports Held Up Surprisingly Well in 1931

Russia Took 56 Per Cent

IN CONTRAST to the considerable reduction in exports of the numerous items comprising the industrial machinery group during 1931 (*A.M.*—Vol. 76, p. 660f), shipments abroad of American metal-working machinery were maintained at an exceptionally high level, amounting to over $40,000,000 as compared with $42,000,000 in 1930 and $40,800,00 in 1929, according to a report of the Industrial Machinery Division, U. S. Department of Commerce. In order to reach this mark it was necessary for American manufacturers to overcome unusually intensive competition based on liberal credit terms often carrying governmental support. Currency difficulties in various foreign countries added to the difficulties of making American exports. Of the total of $40,000,000 representing the value of this trade in 1931, 86.5 per cent was accounted for by shipments to European countries in spite of the keen competition on that continent. Thus, the demand for high-speed production tools and machines continues to be supplied largely from the United States, and the preference in many markets of the world for American equipment of this type may be considered as an acknowledgment of the efficiency and superiority of American designs.

As a result of developments in connection with its industrialization program, Soviet Russia has increased its purchases of American metal-working machinery considerably during the past few years. In 1928 the value of this type of equipment shipped from the United States to Russia amounted to $1,200,000 and advanced to $2,600,000 in the following year. In 1930 an unprecedented flow of orders totaling $14,200,000 boosted Russia to the leading position among foreign markets for this class of American goods. This expansion was continued in 1931, and returns for the 12-month period under review show that Russian requirements of this nature provided an outlet for more than $22,000,000 worth of American metal working machinery, representing about 56 per cent of total shipments to all countries. Leading items in this trade included grinding machinery, forging machinery, lathes, drilling machinery and milling machines.

Exports of metal-working machinery to the United Kingdom also passed the level reached in 1930, an increase of about 3 per cent over the previous year occurring in the 1931 total of $7,040,000. Sheet and plate metal-working machinery, lathes, grinding machinery, pneumatic portable tools and the miscellaneous classification of "other power-driven metal-working machinery" comprised the bulk of the total. It is well to bear in mind, however, when analyzing this trade that the impending British tariff may have accounted for unusually heavy imports at the end of 1931.

The curtailment of industrial activity in Canada and France during 1931 was bound to have an unfavorable effect on the demand for high-production tools and equipment. Exports of this class of goods to Canadian markets dropped from $5,410,000 in 1930 to $3,400,000 in 1931, whereas French purchases amounted to $3,200,000 and $1,550,000 for the same periods. The outstanding items of the shipments to Canada were rolling-mill machinery, sheet and plate metal-working machines and foundry and molding equipment. The leading item in the trade with France was grinding machinery, followed by milling machinery, pneumatic portable tools and the miscellaneous classification of "other power-driven metal-working machinery."

An interesting feature of this survey is the manner in which exports of metal-working machinery from the United States to Germany were maintained in the face of prevailing difficulties. The trade in this instance amounted to the noteworthy figure of $2,216,000 in comparison with the 1930 total of $2,290,000. The greater part of the 1931 total was made up of drilling machinery, grinding machinery and items comprising the miscellaneous classification of "other power-driven metal-working machinery."

In the case of the remaining leading outlets for this class of American equipment a general decline was noted. Shipments to Japan, Italy, Mexico, Brazil, Australia, as well as to other countries of Latin America and the Far East were far below normal. During the years immediately preceding the period under review, exports of American machinery to these markets showed a tendency toward a gradual and steady expansion. With the growing interest in

Principal Foreign Markets for American Metal Working Machinery

Country of Destination	1928	1929	1930	1931
Soviet Russia in Europe	$1,193,388	$2,619,658	$14,187,251	$22,492,394
United Kingdom	6,345,090	8,282,078	6,812,275	7,040,020
Canada	6,937,761	8,374,795	5,409,017	3,390,201
Germany	2,615,427	2,134,327	2,288,719	2,216,108
France	4,690,227	6,367,240	3,192,674	1,530,301
Italy	876,730	1,497,190	951,610	479,437
Japan	1,424,664	1,686,238	1,349,061	393,481
British India	310,102	444,899	388,455	246,999
Sweden	535,847	1,120,477	580,851	222,559
Mexico	540,895	603,688	779,161	218,565
Chile	206,274	427,179	331,064	127,498
British So. Africa	317,604	349,900	216,106	126,913
Netherlands	460,377	625,550	231,665	122,212
Argentine	524,694	547,993	302,396	120,703
Spain	307,975	453,061	367,101	115,959
Czechoslovakia	801,761	658,439	429,414	114,908
Cuba	132,503	157,755	143,643	89,550
Belgium	947,494	762,511	465,076	71,238
Brazil	649,160	463,981	712,290	68,967
Poland and Danzig	(1)	(1)	(1)	57,175
Australia	669,279	580,896	468,177	54,440
Switzerland	136,469	233,230	191,881	53,321
Panama	100,527	87,996	107,110	52,516
Philippine Islands	123,033	140,155	123,469	51,344
Colombia	136,579	105,996	62,362	47,861
China	48,584	124,771	104,247	42,430
Netherland East Indies	245,880	375,076	207,165	28,429
Denmark	80,767	88,315	106,540	28,322
Portuguese Africa	(1)	(1)	(1)	28,078
Venezuela	164,152	158,804	165,085	26,627
Norway	83,742	83,719	79,169	26,752
Peru	120,844	123,195	48,596	26,545
Irish Free State	1,159,893	69,958	200,530	23,673
Finland	67,857	52,891	38,315	20,769
New Zealand	118,483	95,259	67,456	15,720
Uruguay	36,872	57,973	46,738	11,779
Netherland West Indies	123,569	55,512	86,861	11,095
British Malaya	39,813	52,837	23,134	10,551
Soviet Russia in Asia	150,177	51,963	150,561	9,933
Bolivia	73,480	73,580	40,890	4,388
Other Countries	636,838	614,308	489,103	216,951
Total	34,124,809	40,803,393	41,945,398	40,036,918

(1) Included in other countries.

modern industrialization methods, the trade with these regions was proving increasingly profitable, and the uncovering of new markets in the Far East and Latin America was a source of encouragement to American manufacturers. With the adoption of retrenchment measures resulting from the depressed economic conditions, this trade began to show a decided falling off and at the present time is considerably below the level of the preceding year, although it is hoped that with the return of better times, the progress which has been made in this connection will be continued with renewed vigor. The effect of 1931 developments on sales of American metal-working machinery throughout the world is indicated in the accompanying table, which shows the value of exports of this type of equipment to individual markets from 1928 to 1931.

Twenty-seven different classifications of metal-working machinery are covered by this survey, the most important of which was the $5,550,000 item dealing with exports of sheet and plate metal-working machinery. Other outstanding totals were as follows: Grinding machinery, $4,700,000; lathes, $4,000,000; forging machinery, $4,000,000; drilling machinery $2,600,000; milling machinery $2,305,000; foundry and molding equipment, $2,285,000.

Management Technique Advances in Europe

Back in the United States only three days after fifteen months in Europe, WALLACE CLARK, management engineer and consultant, addressed over 300 members of the New York Chapter of the Society of Industrial Engineers and guests from the other management societies, Tuesday evening, May 24, at the McGraw-Hill Auditorium, 330 W. 42d St., New York City, on the subject, "Has Europe Anything to Teach Us in Management?"

Mr. Clark really raised two questions rather than one: "Are they taking management seriously in Europe? Has Europe anything to teach us?" As to the first he stated, "When it gets to be six or seven o'clock after a day which has begun at eight in the morning, we sometimes wish they would take it a trifle less seriously." As to the second, "Europe has not so much to teach us in the technique as in its application. Of course there have been notable contributions to management methods in various countries, but American technique still maintains its leadership. . . Although our technique is better, we can enrich it by studying and adapting the developments in Europe.

"To mention only one example, Germany learned from this country the fundamentals of standardization and simplification, but she has carried much further than we have the technique of developing standards, broadcasting them and getting them used."

BUSINESS ITEMS

Cornwall & Paterson Mfg. Co., Bridgeport, Conn., manufacturer of hardware and screw-machine products, has been taken over by CARL F. SIEMON, as temporary receiver. A permanent receiver will be appointed later. Assets of the company are said to be in excess of liabilities, but the company requires working capital and a receiver is required to protect assets.

Wilson Welder & Metals Co., Inc., North Bergen, N. J., has appointed E. WALTERS as special agent in the Chicago territory. Mr. Walters has his headquarters at Joseph T. Ryerson & Son, Inc.

Allsteel Press Co., Inc., 12015 S. Peoria St., Chicago, manufacturer of a line of punch presses, has established a commercial welding department to handle jobbing work.

A bid of $41,000 for the properties of W. E. Lamneck Co., Columbus, Ohio, manufacturer of stoves and heating appliances, was rejected by Federal Judge Benson W. Hough, who refused to confirm the offer made at public auction. It was declared that the highest bid was inadequate in proportion to the real and actual properties of the concern. The court also advised the receiver, Perl S. Miller, to make further efforts to retain operation of the company.

Sale of the assets of Indiana Rubber & Insulated Wire Co., Jonesboro, Ind., which has been in receivership, to Essex Wire & Wheel Co., Detroit, for $145,000 plus $25,000 for the plant and equipment has been approved in Federal court at Fort Wayne. WILLIAM D. REMMEL and R. W. SEIBERLING, original members of the firm, have been co-receivers of the company. It has been out of production for about a month. The plant is to be opened at once, and the purchaser has agreed to post a bond of $145,000 assuring the creditors of the company the return of at least that amount on its indebtedness.

A bondholders' protective committee has been formed for holders of Consolidated Machine Tool first-mortgage, twenty-seven year 7 per cent sinking fund bonds. BENEDICT J. BAKER is chairman of the committee, while other members are WILLIAM P. FAIRMAN, CLARENCE E. PERKINS, WARREN A. TYSON and J. HARVIE WILKINSON, JR.

The Elmwood plant of New Departure Mfg. Co., Bristol, Conn., will be consolidated with the Meriden plant, according to DEWITT PAGE, president. No changes are contemplated at Bristol.

Absorption of the Armstrong Spring Co. by the Buick Motor Car Co. has been announced by Irving J. Reuter, president of Buick. James Parkhill, general manager of the Armstrong Co., has resigned.

Pawtucket Mfg. Co., Pawtucket, R. I., has been licensed by Dardelet Threadlock Corp. to manufacture and sell bolts and nuts with the Dardelet self-locking thread.

Reed-Prentice Corp., Worcester, Mass., has announced the following changes in its sales organization: G. W. MCINTYRE has been appointed Eastern sales manager, located at 41 Broad St., New York City; D. C. FORSMAN has been appointed Western sales manager, located at 8242 Woodward Ave., Detroit, Mich. Triplex Machine Tool Corp., 50 Church St., New York City, has been appointed exclusive agents for lathes, milling machines, and the complete line of machine tools for New York and Connecticut territory. Wolverine Machinery & Supply Co., 8242 Woodward Ave., Detroit, has been appointed exclusive agents for the Michigan territory for the full line of Reed-Prentice equipment.

Mohawk Mfg. Co., Middletown, Conn., manufacturer of metal specialties, is operating 11 hours a day and six days a week. Good business is anticipated for some time.

PERSONALS

JULES DIERCKS arrived recently on *Mauretania* for a visit to the United States.

PERCY MARTIN, managing director of Daimler Motors, Ltd., Coventry, England, also managing director of Birmingham Small Arms, Ltd., of Wm. Jessop & Sons Co., Ltd., and sundry other interests, also arrived on the *Mauretania* for a brief visit.

CLEMENT FREUND has resigned as manager of apprenticeship, education and personnel for Falk Corp., Milwaukee, to accept an appointment as dean of the college of engineering, University of Detroit, to fill the vacancy caused by the resignation of Dean Russell E. Lawrence. Mr. Freund assumed his new duties June 1.

LESTER B. KNIGHT, JR., has received an appointment as sales manager of National Engineering Co., Chicago, Ill., maker of sand preparing and conditioning equipment for foundries.

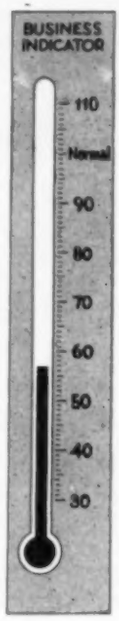
J. E. PERKINS, formerly in charge of porcelain enameling at the Ferro Enamel Corp., is now superintendent of the porcelain enameling plant of the A-B Stove Co., Battle Creek, Mich.

THE BUSINESS WEEK

June 1, 1932

The week's records are not especially promising for those expecting speedy improvement in the business picture under pressure of credit expansion efforts. . . . Most indicators showed some relapse in the level of industrial and trade activity from the first half of May as well as somewhat less favorable features in the financial situation. . . . The unseasonal strengthening in steel output since the outset of the month has slackened slightly as automotive summer schedules are revised, but June is expected to bring a peak in car production, and some stimulus for structural steel demand is coming forward from increasing public construction. . . Carloadings, electric power output and check payments reflect further contraction in manufacturing activity and retail trade. . . .

Securities markets relapsed to new low levels with increasing anxiety over central-European financial difficulties, and evidence that Federal Reserve efforts to induce member bank credit expansion have so far proven unsuccessful. . . . Direct measures by local business-banker committees to break the credit jam may have better luck, but the tide of events is moving rapidly toward congressional action to enlarge the powers of the Reconstruction Corporation and use the public credit to create employment where private credit agencies are unable to operate because of paralysis of financial confidence and industrial initiative. . . . It is clear that constructive forces are converging on the crucial problem of checking the deflation process; but they must be boldly and speedily applied and organized on an international scale to be effective at this stage.



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JOHN D. REILLEY, for many years executive vice-president of the Todd Shipyards Corp., has been elected president to fill the vacancy caused by the death of the late William H. Todd. Mr. Reilley started his career at the Robins Dry Dock & Repair Co. The directors also elected George Dawe vice-president in charge of operations and J. Herbert Todd vice-president and chairman of the executive committee.

THOMAS A. REYNOLDS, McConway & Troley Co., Pittsburgh, has been elected president of the Pittsburgh Foundrymen's Association, for the coming year. GEORGE H. ZOERB, Sharpsburg Foundry Co., Sharpsburg, Pa., has been elected vice-president, and WILLIAM J. BRANT, Bessemer Bldg., Pittsburgh, remains as secretary-treasurer. The executive committee will be made up of H. F. SEIFERT, Westinghouse Electric & Mfg. Co., East Pittsburgh; S. B. CUTHBERT, Edgar Thomson foundry, Carnegie Steel Co., Braddock, Pa.; H. P. SPILKER, Sterrit-Thomas Foundry Co., Pittsburgh; F. C. T. DANIELS, Mackintosh-Hemphill Co., Pittsburgh, and C. E. DAVIS, Homestead Valve Mfg. Co., Coraopolis, Pa.

WINSLOW SAMPSON, for many years associated with S. K. F. Industries, has been appointed Pittsburgh district manager for Kron Co., Bridgeport, Conn.

F. W. SHARP, Johnson Lawn Mower Co., Ottumwa, Ia., was elected president of Iowa Manufacturers Association at the annual meeting last week. Other officers of the organization for the ensuing year are: P. BENDIZEN, Bettendorf Co., vice-president; E. S. SELBY, Jacob E. Decker & Sons Co., Mason City, treasurer, and W. V. HUGHES, Iowa Malleable Iron Co., Fairfield, secretary.

C. A. M. WEBER, of Westinghouse Electric & Mfg. Co., has been elected president of the Engineering Society of Western Massachusetts.

FORREST U. WEBSTER, advertising manager, Cutler-Hammer, Inc., Milwaukee, was elected president of National Industrial Advertisers Association at the annual convention in Cleveland, May 16-18.

• OBITUARIES •

GEORGE CRISSON, engineer in the department of development and research, American Telephone & Telegraph Co., died recently. Mr. Crisson was graduated from Stevens Institute of Technology in 1906. He had been with American Telephone & Telegraph Co. since 1910, and had an important rôle in the development and application of telephone repeaters. While in the employ of the telephone company, Mr. Crisson obtained almost 50 patents relating to communication systems. He was a member of the American Institute of Electrical Engineers.

JOHN H. FRIAR, 67, branch manager of American Can Co., Milwaukee, Wis., died May 19. He entered the industry with the former F. A. Walsh Co., Milwaukee, manufacturer of canned-goods container machinery, absorbed by American Can Co. in 1901.

JOHN H. DREW, formerly general manager of the Worthington Pump & Machinery Corp., died May 25.

HERMAN KNAEBE, president, Midwest Welding Co., Milwaukee, died on May 17.

FERDINAND LUTHY, SR., 79, organizer of Peru Plow & Wheel Co., and for many years head of Luthy & Co., Peoria, Ill., implement concern, died May 19.

JOHN F. LYONS, since Jan. 1, 1930, production manager of American Cooling & Refrigerating Systems, Inc., Wisconsin Rapids, Wis., died suddenly May 15.

WILLIAM PASSMANN, who was president for many years of Loeffelholz Co., Milwaukee, founder of non-ferrous castings, died May 16. He retired in 1922.

• MEETINGS •

NATIONAL ASS'N OF PURCHASING AGENTS
Seventeenth annual international convention and Informal Show, Book-Cadillac Hotel, Detroit, Mich., June 6, 7, 8, 9.

AMERICAN SOCIETY OF MECHANICAL ENG'RS
National Aeronautic and Process Meetings, Hotel Statler, Buffalo, N. Y., June 6-7-8.
Second National Applied Mechanics Meeting, Yale University, New Haven, Conn., June 23-24-25.
Semi-Annual Meeting, Bigwin, Canada, June 27-30.
National Machine Shop Practice Meeting, Buffalo. Week of Oct. 3. Calvin W. Rice, secretary, 29 W. 39th St., New York, N. Y.

SOCIETY OF AUTOMOTIVE ENGINEERS
1932 summer meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 12-17. John A. C. Warner, secretary, 29 W. 39th St., New York, N. Y.

AMERICAN INSTITUTE OF ELECTRICAL ENG'RS
Summer Convention, Cleveland, O. June 20-24. H. H. Henline, Assistant National Eecretary, 33 W. 39th St., New York, N. Y.

AMERICAN SOCIETY FOR TESTING MATERIALS
Annual meeting, Atlantic City, June, 20-24. R. E. Hess, assistant secretary, 1315 Spruce St., Philadelphia, Pa.

NATIONAL METAL CONGRESS & EXPOSITION
174th Regiment Armory, Buffalo, N. Y., Oct. 3-7. Sponsored by A.S.S.T., with cooperation of A.S.M.E., Institute of Metals and Iron & Steel Divisions of A.I.M.E., A.W.S., and the Wire Association. W. H. Eiseman, 7016 Euclid Ave., Cleveland, Director.

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Opportunities for Future Business

Calif., Alameda—Quartermaster General, Washington, D. C., completing plans for a 1 story, 340 x 500 ft. shop building at Benton Field Air depot here. Noted March 24.

Calif., San Rafael—Constructing Quartermaster, will receive bids until June 20 for construction of a group of buildings including 3 story, 100 x 145 ft. barracks building, 100 x 145 ft. machine shop, 111 x 200 ft. hangar and miscellaneous buildings at Marin Meadows bombing base.

Colo., Denver—Colorado Gold Refineries, Inc., H. W. Robinson, Pres., plans construction of a new ore mill for treating gold bearing ores. Estimated cost $250,000. Maturity soon.

Colo., Pueblo—Colorado Fuel & Iron Co., c/o L. F. Quigg, Gen. Supt., plans to remodel and rebuild rail mill to handle larger and heavier rails. Estimated cost to exceed $100,000. Work will be done by owners' forces.

Conn., Greenwich—Superintendent of Highways, awarded contract for a 1 and 2 story, 80 x 80 ft. municipal garage on Mianus St. $26,985. Noted May 26.

Ill., Waukegan—D. T. Alschuler, 713 North Sheridan Road, plans construction of a 4 story factory. Estimated cost $50,000. Architect not selected.

Mass., Lawrence—Globe Furniture Co., 184 Essex St., plans to rebuild furniture factory, storage building and refinishing shop, etc., destroyed by fire. Estimated cost to exceed $75,000.

N. H., Seabrook—Owner c/o C. V. Badger, 50 Merrimack St., Haverhill, Mass., Archt., receiving bids for a 1 story, 50 x 160 ft. factory here. Estimated cost $40,000.

N. J., Hillside—Hillside Chevrolet Co., M. Bloom, Pres., 331 East Jersey Ave., Elizabeth, rejected bids for 1 story garage and show room on North Broad St. here. Estimated cost $40,000. Construction Service Corp., 80 Broad St., Archt. Maturity indefinite. Noted April 21.

N. J., Linden—H. B. Brady, Inc., 333 North Broad St., Elizabeth, Archt., receiving bids for a 1 story, 50 x 120 ft. factory here for W. J. Bush & Co., Stiles St.

N. J., Montclair—F. P. Friedman, 9 Clinton St., Newark, Archt., will receive bids about June 15 for construction of a 1 story automobile service station including air pump equipment, compressor, auto washing equipment, etc., at Bloomfield Ave. and Valley Road here for Globe Realty Co., 790 Broad St., Newark. Estimated cost $40,000. Noted May 5.

N. J., Newark—Baker & Co., 54 Austin St., refiners and manufacturers in precious metals, awarded contract for a plant at 116 Murray St. The new building will be used for reducing and salvaging sweeps and other wastes. Estimated cost $40,000 including equipment.

N. Y., Auburn—Department of Correction, State Office Bldg., Albany, will receive bids until June 7 for shop building, storehouse and electric elevators at Auburn Prison here.

N. Y., Brooklyn—Belfan Building Corp., 26 Court St., will build a 1 story, 50 x 100 ft. service garage and storage building at Jefferson St. and Wyckoff Ave. Work will be done by separate contracts. Maturity later. Noted May 19.

N. Y., Brooklyn—R. Epstein, 277 Madison Ave., plans construction of a 1 story, 40 x 60 ft. shop and service station at Remsen St. and Kingshighway. T. Goldstone, 101 Joralemon St., Archt.

N. Y., Brooklyn—Casper Realty Corp., 6117 4th Ave. will build a 1 story, 90 x 100 ft. service garage, etc., at 4th Ave. and 62nd St. D. S. Lang, 1860 Broadway, New York, Archt. Work will be done by separate contracts. Noted May 19.

N. Y., Elmira—Department of Correction, State Office Bldg., Albany, will receive bids until June 23 for construction and electric work for shop building at Elmira Reformatory here. Noted December 10.

N. Y., Jamaica—N. Moncrief, 110-31 153rd St., will receive bids on separate contracts after October 15 for a 1 story, 38 x 100 ft. repair shop at 111th Road and 155th St. Noted January 28.

N. Y., Long Island City—Chalrin Realty Corp., 163-18 Jamaica Ave., having plans prepared for a 1 story, 40 x 94 ft. service garage at 44th St. and 25th Ave. Estimated cost $40,000 including equipment. M. Klein, 65 Court St., Brooklyn, Archt.

N. Y., Millwood—Westchester County Park Commission, will soon receive bids for construction of a service building.

N. Y., New York—Brody Manufacturing Co., c/o J. W. Friedman, 401 Broadway, recently organized, plans to build or lease plant and equip for the manufacture of metal furniture. Estimated cost $40,000, nicluding equipment.

N. Y., New York—Julenore Co., M. Galt, Pres., 277 Broadway, will build a 1 story, 100 x 200 ft. service garage at 9th Ave. and 204th St. Estimated cost $40,000. N. Langer, 81 East 125th St., Archt. and Engr. Work will be done by separate contracts. Noted May 12.

N. Y., New York—Three Hundred Fifty West 40th St. Corp., awarded contract for construction of a 6 story, 100 x 100 ft. service garage at 346 West 40th St. Estimated cost $300,000.

O., West Sandusky—Bagdad Copper Products Co., plans reconstruction of plant for copper rod and wire manufacturing. Estimated cost $40,000. Separate contracts awarded. Owner now purchasing equipment.

Pa., Johnstown—M. Gloaser & Son, 630 Elder St. (rails, pipe and kindred steel) awarded contract for a 1 story, 40 x 135 ft. plant. Estimated cost $25,000.

Pa., Philadelphia—Franklin Savings Fund, c/o George A. Fuller Co., Morris Bldg., Gen. Contr., awarded contract for construction of a garage at 12th and Filbert Sts. Estimated cost $250,000. Noted April 7.

N. J., Trenton—C. V. Hill & Co., Inc., 360 Pennington Ave., has work under way on construction of two additions to plant for the manufacture of refrigerators.

S. C. Pelzer—Pelzer Manufacturing Co., awarded contract for construction of a manufacturing plant and office. Estimated cost $40,600, including equipment.

Tex., Houston—Continental Wire Bound Box Co., 2324 Maury St., awarded contract for a 1 story addition ot plant. Estimated cost $30,000.

Tex., Houston—Simplex Manufacturing Co., Post Dispatch Bldg., c/o H. H. Ford, Pres., completed plans for construction of a plant for the manufacture of cotton picking machinery. Estimated cost $500,000.

B. C., Vancouver—Spencers Ltd., Hastings and Richards Sts., plans construction of a garage at Candova and Richards Sts. Estimated cost $100,000. W. F. Gardiner, 1301 Vancouver Block, Archt.

Man., St. Boniface—Winnipeg Bridge Co. Ltd., N. A. Cain, Mgr., plans erection of a new plant. Estimated cost $50,000.

Union Soviet Socialist Russia—c/o Amtorg Trading Corp., 261 5th Ave., New York, plans locomotive works at Orsk (Volga Region). Estimated cost $100,000,000. Work will be done by day labor and technical aid contracts. Maturity late 1933; also construction of aluminum plants at Ural Region, Moscow Klibini, Ukraine, and Transcaucasia. $50,000,000.

Equipment Wanted

Ill., Chicago—General Motors Corp., General Motors Bldg., Detroit, Mich.—machinery and equipment for proposed 1 and 4 story, 100,000 sq.ft. assembly plant and exposition building here. Estimated cost $1,000,000.

Mass., Medford—Medford Reo Co.—hydraulic jack, bus and truck type, large capacity.

A Personal Want—

can invariably be filled by a friend.

The Searchlight Section

of this issue covers the current business wants of the industries in which this paper is read.

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